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Multi-User

UniFLEX is the first full capability multi-user operating system available for microprocessors. Designed for the 6809 and 68000, it offers its users a very friendly computing environment. After a user 'logs-in' with his user name and password, any of the system programs may be run at will. One user may run the text editor while another runs BASIC and still another runs the C compiler. Each user operates in his own system environment, unaware of other user activity. The total number of users is only restricted by the resources and efficiency of the hardware in use.



Multi-Tasking

UniFLEX is a true multi-tasking operating system. Not only may several users run different programs, but one user may run several programs at a time. For example, a compilation of one file could be initiated while simultaneously making changes to another file using the text editor. New tasks are generated in the system by the 'fork' operation. Tasks may be run in the background or 'locked' in main memory to assist critical response times. Inter-task communication is also supported through the 'pipe' mechanism.



Support

The design of UniFLEX, with its hierarchical file system and device independent I/O, allows the creation of a variety of complex support programs. There is currently a wide variety of software available and under development. Included in this list is a Text Processing System for word processing functions, BASIC interpreter and precompiler for general programming and educational use, native C and Pascal compilers for more advanced programming, sort/merge for business applications, and a variety of debug packages. The standard system includes a text editor, assembler, and about forty utility programs. UniFLEX for 6809 is sold with a single CPU license and one years maintenance for \$450.00. Additional yearly maintenance is available for \$100.00. OEM licenses are also available.

FLEX™

UniFLEX is offered for the advanced microprocessor systems. FLEX, the industry standard for 6800 and 6809 systems, is offered for smaller, single user systems. A full line of FLEX support software and OEM licenses are also available.



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'68'

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EDITOR - WORD PROCESSOR
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Publisher: Don Williams Sr.

Executive Editor: Larry Williams

Subscriptions and Office manager
Mary Robertson

General Girl 'Friday'
Joyce Williams

Contributing Editors:

Dr. Chuck Adams
Dr. Theo Elbert
Dr. Jeffery Brownstein
Dale Puckett
Russell Gore
Ron Anderson
John Jordan

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----- -ITEMS SUBMITTED FOR PUBLICATION-

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Only GIMIX offers you **SOFTWARE SWITCHING** between **MICROWARE's OS-9** and **TSC's FLEX**. Plus you get the power of the **GMXBUG** system monitor with its advanced debugging utility, and memory manipulation routines. A wide variety of languages and other software is available for these two predominant 6809 Disk Operating Systems.

You can order a system to meet your needs, or select from the 6809 Systems featured below.

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GIMIX' CLASSY CHASSIS™ is a heavyweight aluminum mainframe cabinet with back panel cutouts to conveniently connect your terminals, printers, drives, monitors, etc. A 3 position keyswitch lets you lock out the reset switch. The power supply features a ferro-resonant constant voltage transformer that supplies 8V at 30 amps, + 15V at 5 amps, and - 15V at 5 amps to insure against problems caused by adverse power input conditions. It supplies power for all the boards in a fully loaded system plus two 5 1/4" drives (yes! even a Winchester) that can be installed in the cabinet. The Mother board has fifteen 50 pin and eight 30 pin slots to give you the most room for expansion of any SS50 system available. 11 standard baud rates from 75 to 38.4K are provided and the I/O section has its own extended addressing to permit the maximum memory address space to be used. The 2 Mhz 6809 CPU card has both a time of day clock with battery back-up and a 6840 programmable timer. It also contains 1K RAM, 4 PROM/ROM/RAM sockets, and provides for an optional 9511A or 9512 Arithmetic Processor. The RAM boards use high speed, low power STATIC memory that is fully compatible with any DMA technique. STATIC RAM requires no refresh timing, no wait states or clock stretching, and allows fast, reliable operation. The system includes a 2 port RS232 serial interface and cables. All GIMIX boards use gold plated bus connectors and are fully socketed. GIMIX designs, manufactures, and tests in-house its complete line of products. All boards are twice tested, and burned in electrically to insure reliability and freedom from infant mortality of component parts. All systems are assembled and then retested as a system after being configured to your specific order.

56KB 2MHZ 6809 SYSTEMS WITH GMXBUX/FLEX/OS-9 SOFTWARE SELECTABLE

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 to substitute Non-volatile CMOS RAM with battery back-up, add 300.00
 for 50 Hz export power supply models, add 30.00

Either controller can be used with any combination of 5" and/or 8" drives, up to 4 drives total, have data recovery circuits (data separators), and are designed to fully meet the timing requirements of the controller I.C.s.

5 1/4" DRIVES INSTALLED IN THE ABOVE with all necessary cables

	SINGLE DENSITY		DOUBLE DENSITY		
	Formatted	Unformatted	Formatted	Unformatted	
40 track (48TPI) single sided	199,680	250,000	341,424	500,000	2 for \$700.00
40 track (48TPI) double sided	399,360	500,000	718,848	1,000,000	2 for 900.00
80 track (96TPI) single	404,480	500,000	728,064	1,000,000	2 for 900.00
80 track (96TPI) double	808,960	1,000,000	1,456,128	2,000,000	2 for 1300.00

Chart shows total capacity in Bytes for 2 drives.

Contact GIMIX for price and availability of 8" floppy disk drives and cabinets; and 5" and 8" Winchester hard disk system.

128KB 2Mhz 6809 DMA Systems for use with TSC's UNIFLEX or MICROWARE's OS-9 Level 2

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 to substitute 128KB CMOS RAM with battery back-up, add 600.00
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 for each additional 64KB CMOS STATIC RAM board, add 988.64
 for 50 Hz export power supply, add 30.00

NOTE: UNIFLEX can not be used with 5" minifloppy drives.

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SEE GHOST AD PAGES 54, 59, 64

Does timesharing on a small system make sense? It does with OS-9 Level One!

Now two (or more) acts can share your microcomputer stage. You will no longer have to walk away from your computer while it is busy running a long program. Because OS-9 is a multitasking operating system, you can be running a BASIC program while editing a PASCAL program, for example. This lets you make more efficient use of your time and your system, even if you only use one terminal. If your application requires multiple, independent terminals, one OS-9 system can do the work of several single-user systems.

The convenience of an advanced operating system

Sophistication does not require complexity. Many OS-9 users say that it is actually easier to use than the older 6800-type operating systems. Consider how easy it is to run multiple programs: to run a program you just type its name and hit 'return.' To run a program as a separate job, you type its name, an '&' character, then hit return. The program runs as usual, but OS-9 comes back immediately and is ready for your next command. Simple commands let you see each program's status, set its priority, or abort it.

The file management system has fast, byte-addressable random-and sequential-access files. The tree-structured multiple directory system lets you create separate disk directories for each user, project, or application. Command line I/O file redirection means you specify what device and/or files a program will use when you run it, not when you write it.

Efficiency and hardware versatility

No other operating system can run on such a broad range of hardware: the overall RAM requirement for Level One is 32K to 56K RAM. Memory utilization is superlative because OS-9 lets multiple tasks "share" the same reentrant program. For example, if two users run BASIC#9, only one "copy" is actually loaded into memory. The Level Two version of OS-9 can utilize up to a megabyte of memory on systems having memory management hardware (both versions come with complete timesharing support).

OS-9's device independent I/O system can handle almost any number and combination of I/O devices: five or

eight inch diskettes, winchester disks, disk cartridges, serial and parallel ports, memory-mapped video displays, and more. Microware offers a large selection of "stock" device interface software modules, or you can create your own: all the information you need is in the manuals.

Excellent support and documentation

Each OS-9 package comes with a User's Manual and a System Programmer's Manual that cover every aspect of OS-9. If you have special requirements, you can even purchase the Source Code for most of OS-9 and related software. At Microware we take pride in offering the best customer support in the business. Technical advice and assistance by phone, mail or telex is available during all business hours.

Superb software tools

In addition to BASIC#9, Microware offers: PASCAL, Interactive Assembler, Macro Text Editor, Stylograph, Word Processor, Interactive Debugger, and coming soon, COBOL, and C language compilers.



BASIC#9 has a dual personality. One craves meat-and-potatoes BASIC. The other prefers Programme ala Pascal.

Some people say BASIC#9 is really a PASCAL, in disguise, others say it's still BASIC. You'll understand this delightful dilemma when you look at both versions of the "bubble sort" program shown below: both can be run by BASIC#9. The program on top is unstructured and hard to understand, but it's traditional BASIC. The program on the bottom is well-structured and easy to follow, a virtue of PASCAL. With BASIC#9 you can program either way, or mix the best of both. It's like getting two languages for the price of one.

SORT AN ARRAY IN ASCENDING SEQUENCE	
90	DIM A(5)
100	I=5
110	IF I=1 THEN 200
120	FOR J=1 TO I-1
130	IF A(J)<A(J+1) THEN 170
140	T=A(J+1)
150	A(J+1)=A(J)
160	A(J)=T
170	NEXT J
180	I=I-1
190	GOTO 110
200	RETURN
DIM array(5)	
outer=5	
WHILE outer>1 DO	
outer=outer-1	
FOR inner=1 TO outer	
IF array(inner)>array(inner+1) THEN	
temp=array(inner+1)	
array(inner+1)=array(inner)	
array(inner)=temp	
ENDIF	
NEXT inner	
ENDWHILE	
RETURN	

Makes programs better

BASIC#9 has five kinds of loop structures: WHILE...DO, REPEAT...UNTIL, LOOP...ENDLOOP, FOR...NEXT and IF...THEN...ELSE. If one of the five built-in data types (byte, integer, real, string, and boolean) doesn't suit the problem, you can make a new one of your liking with the TYPE statement. Need a tree, linked list, or symbol table? Complex non-rectangular data structures using any combination of data types are easy to define. Modular programming breaks down large programs to smaller, more manageable elements. BASIC#9 or machine language recursion plus parameter passing to any other BASIC#9 or machine language procedure. There is a complete set of statements for device-independent sequential or random I/O, plus a superlative PRINT USING system.

Makes programs faster

No full-feature BASIC for any 8-bit microprocessor is faster than BASIC#9, because it is an interactive compiler. As each program line is entered, it is instantly compiled to a smaller, faster form. Because BASIC#9 automatically converts programs back to original "source" form for listing, it is as friendly and easy-to-use as traditional interpreter BASICs. Each procedure can be independently compiled to position-independent, reentrant, ROMable format. Microware developed a new ultra-fast 9-digit-accuracy floating point math system just for BASIC#9. And if that's still not fast enough, there's BYTE and INTEGER arithmetic.

Features that make programs easier to write

The compiler is integrated with a

full-feature string AND line-number oriented text editor. If you make a mistake, BASIC#9 tells you instantly. String-oriented commands such as search, change, change all occurrences, delete, and insert can be used on programs with or without line numbers. There's an automatic line renumbering function too.

Features that make programs easy to test

Debugging often takes longer than writing a program. That's why BASIC#9's integral high-level debugger sets it apart from all other compiled OR interpretive languages. The TRACE command shows you each statement executed in BASIC form, plus the result of any expression evaluation. STEP lets you run one or more statements at a time, LET and PRINT allow you to examine or change the values of variables, by name. STATE lists procedure calling order. And there are nine other debug commands. If you need to correct a program, you can edit, recompile, and rerun it in seconds.

Microware software is available for most popular 6809 computer systems.

Write or call for our free catalog. We accept phone orders and MasterCard and VISA orders.

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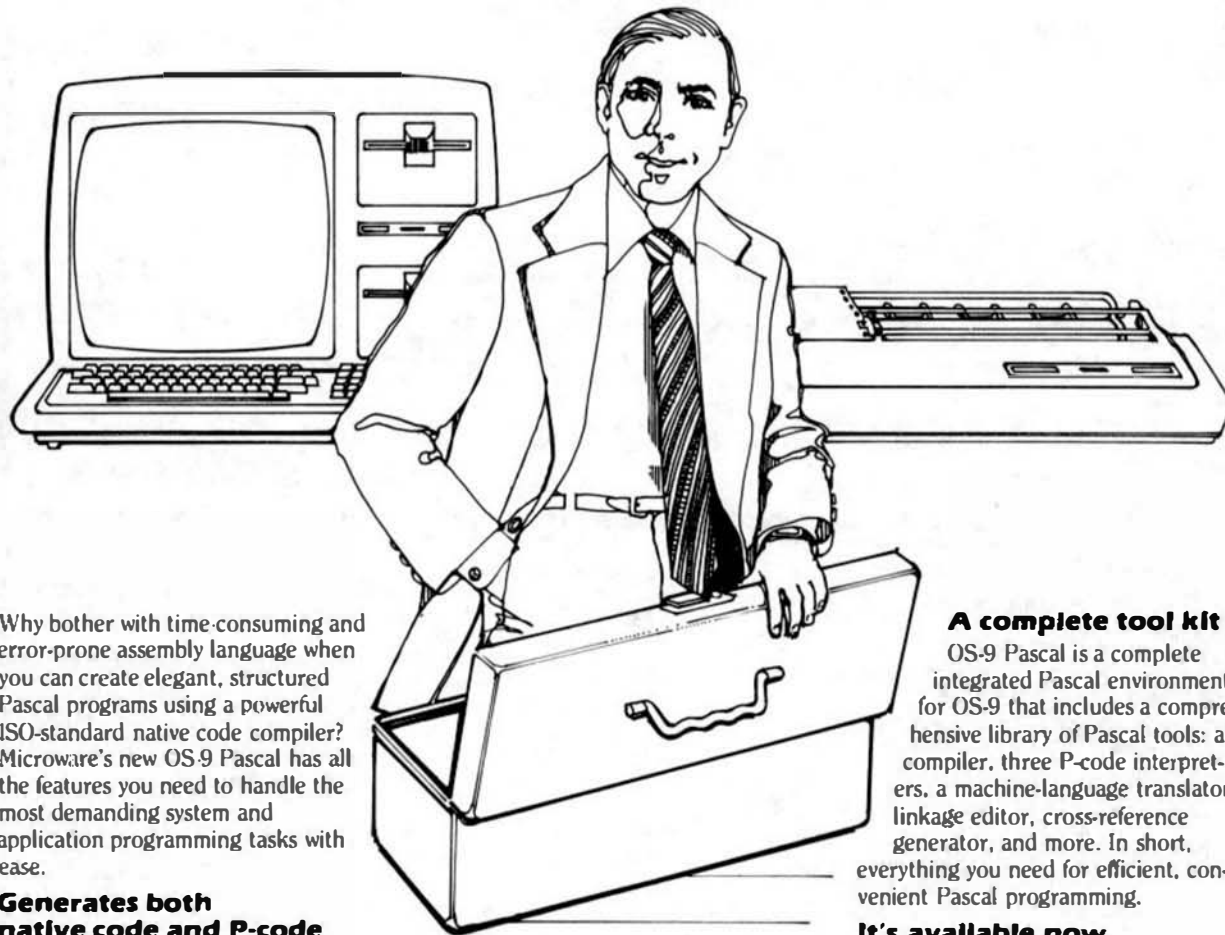


MICROWARE

Microware Systems Corporation
5835 Grand Ave., Des Moines, IA 50312
(515) 279-8844 Telex 910-520-2535

OS-9 PASCAL™

A New Programming Tool For Experts



Why bother with time-consuming and error-prone assembly language when you can create elegant, structured Pascal programs using a powerful ISO-standard native code compiler? Microware's new OS-9 Pascal has all the features you need to handle the most demanding system and application programming tasks with ease.

Generates both native code and P-code

With OS-9 Pascal you don't have to make that difficult choice between easy-to-use P-code Pascal or fast native-code Pascal. You can compile your Pascal program to pure 6809 assembly language source code. OS-9 Pascal performs extensive local and global code optimization which results in incredibly fast and compact machine language programs. Or if you prefer, OS-9 Pascal can generate P-code for interpretive execution to simplify program debugging and testing. There's also a Virtual Memory P-code Interpreter that can run huge Pascal programs that other microcomputers can't touch. In fact, you can run programs using any combination of P-code, compiled machine language, or handwritten assembly language procedures.

ISO Standard Pascal Plus

OS-9 Pascal conforms to the ISO industry standard for Pascal, so you are assured of portability to or from any other computer that uses standard Pascal. OS-9 Pascal protects your software investment and gives you access to a vast body of existing Pascal software. Beyond the standard, we've added natural extensions to OS-9 Pascal to make it even more versatile, such as: relaxed identifier syntax; separate procedure compilation; random access file and interactive I/O; bitwise logical operators; run-time error handling; and much more. And because it runs under OS-9, it is inherently multiuser and multitasking.

A complete tool kit

OS-9 Pascal is a complete integrated Pascal environment for OS-9 that includes a comprehensive library of Pascal tools: a compiler, three P-code interpreters, a machine-language translator, linkage editor, cross-reference generator, and more. In short, everything you need for efficient, convenient Pascal programming.

It's available now

OS-9 Pascal is now available *off-the-shelf* in all OS-9 disk formats. It can be used on any disk-based 6809 computer running OS-9 Level One or Level Two. Each OS-9 Pascal package includes the compiler, machine language translator, P-code interpreters, run-time support packages, linkage editor, demonstration programs, and a comprehensive 120-page User's Manual.

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FORTH FLEX COMPATIBLE FORTH

COMING SOON

META—X—FORTH

Create ramable code from
X—FORTH for any processor!OS-9 VERSION
COMING

By Charles (Chuck) Eaker, Ph.D

X-FORTH NEWS

COMING SOON . . .

OSBORNE GENERAL LEDGER in X-FORTH for FLEX and OS-9

This is the same G/L program that you usually see in BASIC but with the speed advantage of X-FORTH and of course runs much faster than the BASIC version. It does NOT require X-FORTH to run.

META-X-FORTH

This package will take an X-FORTH program and compile it into object code for any processor. This means that you can use X-FORTH to create programs for other computers. The code produced is ramable.

OS-9 FORTH

We are taking X-FORTH and putting it on OS-9. This will mean that programs written in X-FORTH will run on both FLEX and OS-9 with minimal changes.

X-FORTH NOTES

If you are considering buying FORTH, then you are probably trying to decide which one of the two that are available for the 68XX to choose. Well, perhaps I can help by telling you some of the more major differences between the two.

X-FORTH runs in the FLEX (or OS-9) environment just like BASIC or any other FLEX program. The files that it uses are the same as any other FLEX program. This makes it compatible with other programs or utilities that you may have. The other FORTH is not. (see Ron Anderson's columns)

X-FORTH at \$149.95 is more or less the same package that you get for \$250.00 for the other FORTH. That is \$100.05 less.

X-FORTH is faster, about 25% faster, although, exact timing tests haven't been run yet. The reason X-FORTH is faster is because we coded many of the important things in assembler, not high level FORTH.

X-FORTH documentation is without a doubt the best that's available for any FORTH on any computer. The manual is divided into four major sections. The first section (approx. 100 pages) is a very good tutorial on FORTH in general and gives the first time user a feel for the system. The second section (approx. 60 pages) goes into the extensions that were added for FLEX. The third section, the users manual (approx. 130 pages) is the part you will use the most. Suppose you wanted to work with strings, all you do is look in the section on string operations for all the information you would need. Each section explains in easy to understand terms how each word works and how to use it. The last section is the glossary, (approx. 66 pages) All the words described in the users manual are listed alphabetically with complete descriptions.

THE FUTURE

X-FORTH will be our major applications language in the future. Life is too short for BASIC. We are planning a complete business package in X-FORTH, A/R, G/L, A/P, etc. Because X-FORTH will run on many different operating systems, applications written in it will be much easier to maintain and of course the market is much bigger.

Well, I hope I've been able to answer many of your questions, but if you have more I'm just a phone call away.

Frank

Supplied on one 8" Disk or 2, 5" disk(s) with a 400 page manual in a hardcover binder. Disk(s) have the source of everything but the core of X-FORTH, which will be available later at extra cost. You get it all!!!

All for only

\$149.95
+ \$2.50

Manual available separately for \$49.95, with credit for later purchase.

OS-9 Version Available
October 15th add \$10.00

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BY JIM SCHREIER

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THE PURCHASE ORDER system adds purchase orders to the BILL PAYER. This package of programs adds another level of control to your expenditures. Prints out purchase orders and keeps track of purchases. Requires the Bill Payer to work.

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Includes manual and source supplied on disk in TSC Extended Basic.

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PURCHASE ORDER	49.95
INC/EXP. LEDGER	\$49.95

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NEW

By Dick Bartholomew

BASIC PROGRAMMERS TOOLKIT\$49.95 object only
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1. DECOMPIL Turns .BAC into .BAS files.
2. XREF Cross reference listing of BASIC programs.
3. EDIT Edit a BASIC program that's in memory while in BASIC!!!!

NOTE: For TSC XBASIC only

NEW

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\$69.95 with source on DISK!

1. CRTSET like FTYSET for CRT's
2. USERINFO adds more than just diskname and number.
3. SCAN List forward and backward thru a file.
4. BROWSE like SCAN but in memory
5. LOAD offset loader
6. DISKDUMP to any port
7. INIT memory set command
8. SAVETEXT to disk
9. READTEXT from disk
10. REDIRECT change control port
11. REPLACE prompt memory change
12. MIRROR BACKUP last sector copy

PASSWORD PROTECTION PACKAGE\$69.95 object only
\$89.95 with source on DISK!

Six programs that allow you to protect your system by preventing a bootup without the proper password.

— Warning —

PASSWORD can be overcome if the user has access to another disk without password protection that will boot FLEX.

Programs are written in 6809 assembly language.

See Catalog on Page 9 for Ordering Information.

Exclusively from FRANK HOGG

NEW

TIME/COST STUDY

by DIGITECH

We are pleased to announce a time/cost study program written with the "legal profession in mind. It will allow the attorney to keep accurate records of time and costs on a case/client basis. Reports can be generated at any time for any or all clients. Reports list the following: Client name and address, case number, entry date, type of service, time, cost, check number, status (open, billed, paid), time/cost subtotal by the case, time/cost totals. Full editing for clients and/or cases.

System requirements are:

6809 computer with 512K, FLEX, XBASIC, DUAL 8" double sided/double density disk, and a smart terminal.

Price \$400.00 includes: 8" disk with compiled basic programs and manual (source not available).

*The program can be modified for any time/cost type study.

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by DIGITECH**PAY ROLL PROGRAM**

- Maintains all information on all personnel.
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From DALE PUCKETT

**Correct those misspelled words with SPELLTEST.
FAST 6809 MACHINE LANGUAGE**

SPELLTEST reads in text, tests it for misspelled words, and then lets you correct them. It then writes the corrected file back to disk. You do NOT have to EDIT the file!!! All the other spelling programs flag the words and you have to edit the file. SPELLTEST does the work for you!

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FAST...reads and tests a 3500 word text (about 10 pages) in less than a minute!! SPELLTEST is first with an INTELLIGENT DICTIONARY!

\$199.00 source available for \$100 additional
Comparable to CP/M programs costing \$295.00.

Buzztest

Buzzword tester coming soon

Readtest

Readability tester

\$74.95 with source \$54.95 without

SOFTWARE CATALOG

PROGRAM	LANGUAGE	OBJECT	W/SOURCE ON DISK
2-FORTH	6809/6809		***\$149.95
*Bill Payer	TSC XBASIC		89.95
*Purchase Order	TSC XBASIC		49.95
*Income/Expense	TSC XBASIC		49.95
*Mail Thru	TSC XBASIC		169.95
Basic Prog. Toolkit	6809 ASMB	\$49.95	69.95
Password Protection	6809 ASMB	69.95	89.95
Extended Utilities	6809 ASMB	69.95	69.95
Job Control Prog.	6800/6809 ASMB	49.95	89.95
Editor	6800/6809 ASMB	39.95	59.95
Readtest	6800/6809 ASMB	34.95	74.95
Help	6800/6809 ASMB	29.95	49.95
Dynasoft Pascal	6809	59.95	** 89.95
Plot	TSC XBASIC		44.95
Read 78580 Paper	6809 ASMB		34.95
Super Slouth	6800/6809		99.00
280 Super Slouth	6800/6809		99.00
Cross Assembler	MACROS FOR TSC 6809 ASMB		E.A. 49.95
	6800/1, 6805, 6502, Z-80, 8080/5	3 for	99.95
Mailing List	TSC XBASIC/6809		99.95
Form Display	TSC XBASIC/6809		49.95
Tabula Rasa	TSC XBASIC/6809		100.00
Time/Cost Study	TSC XBASIC/6809		400.00
PAY-DAY	TSC XBASIC		195.00

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Specify 5" or 8" size disk and if for 6800 or 6809 system.

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DATAMAN+ is password protected at the menu level so that redundant password prompts are eliminated. We've added the human touch with the use of the operators name and calculator style input. DATAMAN+ checks for valid data types on input thus eliminating erroneous data in your database.

DATAMAN+'s report writer has added intelligence so that separate select programs need not be run to create different reports from the same database. As a matter of fact, the report writer is so flexible that you can use it to create invoices, statements, even form letters using data from the database. You can even perform calculations with the data and put the results in the report.

Setting up your system to run DATAMAN+ is very easy and automatic. The entire system has been designed with the inexperienced user in

mind. The operation of the system is so easy that although a manual is provided none is required to run DATAMAN+.

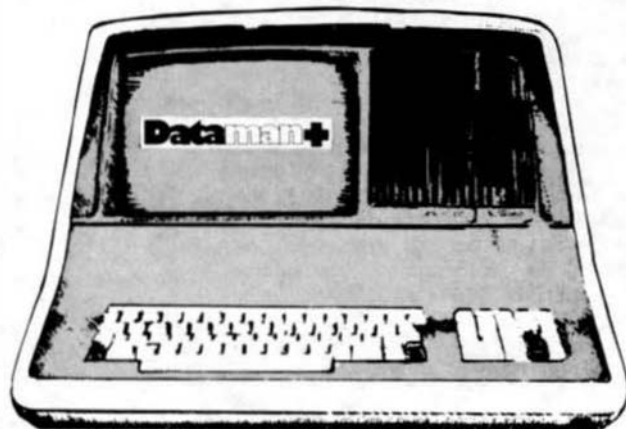
It's easy to create databases and reports with DATAMAN+. Full editing capability has been added to make it a snap. DATAMAN+ is the first truly RANDOM DBM system to allow any size record and any number of fields.

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An upgrade will be available for users with DATAMAN.

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Flex User Notes

Ronald W. Anderson
3540 Sturbridge Court
Ann Arbor, MI 48105

SPELLING LESSONS

You, my readers have been kind to me beyond the call of duty. Recently I received a copy of Peter Stark's (Star Kits) Magic Spell program. Magic Spell is one of those programs that find misspelled words and typographical errors for you. These have been available for CP/M systems for some time, but I think this is the first Flex compatible version. Peter sent a note along asking for contributions of more words for his dictionary, which was already about 329 sectors. It therefore nearly fills a 5 1/4" disk of the 35 track variety. Peter has worked things out so that the dictionary may be continued on a second disk. There are provisions for adding words to the dictionary when you run Magic Spell.

My reason for saying that you have been kind to me, is that I have found typographical errors in every one of the files for this column since Don Williams started publishing it. Let me hasten to add that I've been sending Don my material on a disk each month, and that the errors are mine and not his. I've spelled "precede" and all of its derivitives wrong (precede) for a long time. A reader wrote and pointed out that I had spelled "corollary" wrong recently. I also found that I've spelled "explanation" wrong several times. The most disturbing thing was to find the number of typographical errors that got past my proofreading of each column. I have mistyped "variable" as "varialbe" or worse many times. Perhaps with Magic Spell to run on each text before I send it to Don, there will be fewer errors.

The reader that pointed out my error with corollary also asked if my street was spelled correctly in the column header. It has not been correct since I started sending Don the text file and he added the heading. I must admit that I have looked at it for over a year and never seen the error. The street is Sturbridge and not Strubridgel (Don please correct your file.)

To get back to Magic Spell, it first prompts you for the name of the text file and then reads it. As it is read, Magic Spell must prepare a list of all the words it encounters. Peter points out that with a 56K system you can read a file of over 100,000 bytes, and run Magic Spell on it. There are many words in any text that are repeated numerous times. Therefore the list of words is much shorter than the text file. Next Magic Spell asks you for the name of the dictionary file, and it then reads that file and compares its contents with the words from your text. It dumps any word that is not in the dictionary to your terminal and you can decide whether to ignore it (for example if it is a proper name like Chicago or Peter Stark), mark it, or save it. Marking a word may be done two ways. If you enter Magic Spell in the printer mode, a marked word will be printed to your printer. In any case, it will be marked in memory by Magic Spell. After all the words in the dictionary have been read, Magic Spell asks if you have a continuation of the dictionary on another disk. You may insert the continuation disk or end the run at that point. Magic Spell then asks if you want to mark the words in the text file. If you answer yes, it will read the file, add *** after each word you have indicated to be marked, and write the result to another file and leaving your original file intact. You may then edit the file, searching for *** and making corrections as desired. Of course you may just use your printed list and search for your misspelled words or typographical errors in the original file without having the places

marked. You will probably decide to use one method or the other based on how good your editor is at searching for words.

There is more. At the start of the process you may choose whether to list all groups of characters separated by spaces or CR, in which case you will get numbers, symbols, and words. You may alternately decide to list only "reasonable words". This choice lists only "all letter" combinations. Magic Spell prompts you as to whether you want to write a new dictionary file when you run it. If you say 'Y', all the words you choose to save will be added to the dictionary. My suggestion is to write down all the questionable words, look them up in the dictionary and verify their correctness, type them into a new text file, and run Magic Spell on them with the "write new dictionary file" option on. When this is done, the original dictionary file is kept intact and a new one generated with a name specified by you. The reason for my cautious approach is simple. The dictionary does not do very well correcting your spelling if you put misspelled words in it.

I've found using Magic Spell a bit like eating popcorn. I couldn't stop. I ran it on all my old column files and my book manuscript, and in the process added about 2000 words to the dictionary. I've sent Peter the list with a caution to check carefully for my misspelled words. Peter has since returned my list with corrections, and added my words to Magic Spell's dictionary.

I suppose there will be more spelling checker programs, but none will be much better than this one. Since the text file is read and the words sorted initially, it doesn't take longer to run the dictionary file "against" your text words for a very large file or a small one. Of course if more words are output, that takes longer, and the time to read the text file is larger for a big file. I processed files of over 100 sectors, however, and found no intolerable delays in the process. My only wish was for a more inclusive dictionary. I've found that even a letter of one page or so will turn up a few words that are not in the dictionary. Still though, 50 new words found in a 60 sector text file, comprise only about 3% of all the words in the file. 97% is not bad for a start! By the time you read this, I would guess that Peter's dictionary will be considerably expanded. Oh, yes, nearly forgot to mention that Magic Spell ignores case. WORD, word, and WoRd are all the same when comparisons are made to the dictionary. I can only say try it, you'll like it.

I've just run Magic Spell on the text to the end of the last paragraph. It reported these words as not in the dictionary: cautious, checker, derivatives, disturbing, intolerable, mistyped, popcorn, precede, and variable. The last two were the deliberate misspellings above. The others, according to my dictionary (the one printed on paper), are valid, and I will add them to the dictionary file. The word mistyped could be considered a "colned word", and its appearance doesn't disturb me at all. There were several other words listed, but they were obviously proper nouns like Chicago, Anderson, Ann, Arbor, etc. It will always be necessary for a spelling program to list these unless you put the most common in your personal version of the dictionary. You could put such items as your own name, street, city, state, etc. in your dictionary, and they would not then appear in the list for every letter you run through the spelling program.

A dictionary for this kind of program is a "horendous" (horrible-tremendous) task because it has to have all forms of the word in it. DERIVE, DERIVATION, DERIVATIVE, DERIVATIVES, DERIVATIONS, DERIVES, DERIVED, DERIVING, etc. Peter's dictionary as supplied was over 10,000 words, and I have added more than 2000. It is a bit amusing to find that the dictionary had words

like "Inconsistencies" but was missing such words as ate, spin, plane, and grammar.

Since writing the above, some time has passed and I've found that caution is indeed required in adding words to the dictionary. Peter found a dozen words that I have been misspelling for years. Just because you've always spelled it that way, don't assume that it is simply an omission from the dictionary. Look it up in Webster's and verify that you have the correct spelling, or if you are lazy like me, and there is another possible spelling, try it and see if Magic Spell will accept it. If you write a great deal, as I do, Magic Spell is a necessity.

STYLOGRAPH UPDATE

I also recently received a copy of Stylograph version 2.0 for testing. Bob Bundy specifically asked that it not be reviewed, since it was in the "early user testing stage". I can tell you that it has several new features that make it even more useful. There is a HELP mode in which the user can get a list of all the commands that are accepted by Stylograph. Stylograph will now edit a file too long to fit the edit buffer, using a NEW command similar to several other editors. Bob will also be supplying a utility to allow you to configure Stylograph to your terminal and printer. Currently, Bob has files for 13 printers and several kinds of letter quality printers as well as two kinds of standard "TTY" line printers. Some of the new line printers (such as the Epson) allow backspacing and can therefore be used with such fancy features as underlining and boldface (restricking or overprinting). Bob has provided for these printers as well. In my opinion, this is an ideal editor for a "text processing only" installation. A reasonably intelligent person with some typing skill should be able to learn how to use this software in a day. To take advantage of all the advanced features might take a little more learning time, but the basics may be absorbed very quickly. I'll have a more complete review when the final version is released.

XFORTH IS FLEX COMPATIBLE

My friend Art Weller tells me that someone who programs in FORTH is a "forthwright". If you are one of those, you will be interested in XFORTH from Frank Hogg Laboratories. XFORTH is designed specifically for compatibility with the FLEX operating system. The versions of FORTH supplied by the FORTH Interest Group essentially have their own operating system. They rely on you, the user, to keep track of the location of your program on the disk. Disk sectors are grouped in fours to make "screens". It is up to the user to document which screen has what program (Fig prefers application rather than program). These screens don't use a directory of any kind, and therefore can't be accessed by utilities in FLEX.

Chuck Eaker, author of XFORTH, decided that it should be possible to use standard FLEX disk files, either sequential or random, and he has achieved this goal rather nicely. An application or program in FORTH becomes a file in XFORTH. There are some words that allow opening of a file for editing a new program, expansion of the file, copying, etc. Any number of files may be open at the same time. The files "stack" so to speak. The first one opened, occupies the first screen numbers, and later ones the higher screen numbers. For example, if you open two files that are three screens long each, the first will occupy screens 0 to 2, and the second screens 3 to 5. You can override that assignment and make the first screen of any file 0 at any time. Frank Hogg has written a very nice screen oriented editor for XFORTH, and a couple of versions are supplied. There is the deluxe version for the CT-82, 8212, 8209 terminals, that uses all the features such as half intensity and the various cursor forms, and a version for dumb terminals. My terminal is "dumber than dumb", and I had to do some modifications to get it

to work with XFORTH, but it is now working very nicely.

XFORTH has a math package that includes not only double precision (32 bit) arithmetic, but triple precision (48 bit) as well. It includes a set of words for handling of data or text files as well (both random and sequential). Chuck has even done a sample Cash Journal program that uses the features for handling data files. Provisions are made for defining a record structure (much as in Pascal) and accessing individual fields of a record. String functions similar to those found in BASIC are also provided as part of the package. All of these "extensions" of Fig FORTH are written in XFORTH and supplied in XFORTH source code form. You may "load" XFORTH with the file handling features for one application and with the extended precision math package for another.

No discussion of XFORTH would be complete without mentioning the very complete tutorial manual on FORTH and all the extended features included with XFORTH. I've mentioned this manual previously, and I still think it is the best and most complete discussion of FORTH that is available at this time. It is written in an "easy" style with descriptions and abundant examples of uses of the various words that comprise FORTH.

MISCELLANEOUS

Seems I've gotten off on software reviews this time. I guess there's no harm in that for once. Several of the software suppliers seem to think that I am good at finding bugs in their software, so they have been sending me early releases for testing. Perhaps it is not that I am better at finding bugs, but that I respond quickly with a letter describing the problems I find.

I recently have had some second thoughts about my Assembler programming techniques. You may recall some statements I made about it taking a day to make a simple change in a large Assembler program because the change usually results in unwanted side effects. The reason for side effects, I've decided, is poor coding in the first place. I'm beginning to see the reason for the strict rule of structured programming, that a routine should have only one entry point and one exit point. If an assembler program is written with structure in mind, and it is done modularly, there should be no more problem with changes to it than there is with a high level language. My theory has not yet been tested, but I have just finished the preliminary work on a program in Pascal, and I may find it necessary to code some of the procedures and functions in Assembler to reduce the size of the object code. I will most likely have some results to report in a future column.

I've finally gotten around to trying Brian Bailey's FILESORT, and I think it is terrific. Just what I needed to help me find a file that I know is on some disk somewhere because I saw it the other day. Only problem I can see is that it is necessary to use FILESORT regularly to maintain a current index of files.

I've also gotten around to getting most all of the files I've had on 5 inch disks, transferred to 8 inch disks. I've had the Qume drives in operation for a year now, and still had lots of software supplier's original software on the small disk on which it was supplied. I put all I had for my 6809 on one disk, and then did the same for my 6800 software on a second disk. That means that I can relegate the small drives to being used just once in a while when someone sends me something on a small disk. It also makes it easier to find things because I now have some 35 fewer disks to juggle on a day to day basis. I will, of course still keep the supplier's originals as archive files for one of those days when everything does go wrong and I wipe out my running version and the backup. This way, I have a backup backup. The only discipline required is to transfer anything that arrives on a five inch disk to the large one immediately.

MORE TIME AND BYTE COMPARISONS

In the July issue of '68' Micro Journal, I presented a program in Pascal for finding Prime numbers. At that time, I indicated that it was a slight improvement over the one that I ran previously as a comparison of several compilers. I've run it on some other Pascal compilers and the results follow:

Pascal	Time	User Bytes	Total Bytes
Lucidata 158	598	3929	
Dynasoft 143	301	1490	
Omegasoft 66	940	2465	
TSC	59	721	14334

This bears a little explanation. Lucidata and Dynasoft are both P-Code compilers, and therefore generate less code for the user program. Lucidata has a utility that allows saving the user code plus the portion of the P-code Interpreter that is needed. In this case, we are only using integer arithmetic and a large portion of the interpreter is not involved. When this procedure is used, the byte count shown is the result. Dynasoft is an integer only Pascal, and its total runtime package is 1187 bytes! OmegaSoft and TSC are Native Code compilers. OmegaSoft has an associated relocatable assembler, which allows library searches, so that only the runtime packages that are actually used need be loaded to comprise the final binary file. TSC has a procedure for moving the P-code down in memory to overlay some of the interpreter if it is not used, but the operation is manual and involves using the monitor to reset a pointer for the start of the Pascal Stack. I didn't do that for this test, so the package size reported is the entire runtime package plus the user bytes. All of the byte counts are for program only, RAM for variables is additional and should be nearly identical for all four compilers for this integer arithmetic program.

The program compiled in Lucidata and Omegasoft as listed in the July issue, with no changes whatever. It compiles in TSC by commenting out the first line. Dynasoft doesn't accept braces as comment delimiters and these had to be replaced by (* and *). Also, it only looks at the first four characters of variable names, so PRIM and PRIMSQUR looked like the same variable. I changed PRIMSQUR to PRMSQUR and the program compiled and ran correctly.

Dynasoft is a winner if you don't need what isn't implemented. It is a natural for a "control" application. Dynasoft and Lucidata win for simplicity of compilation and compile time. P-Code compilers of course don't have to go through an assembly step. Lucidata wins in efficiency of memory usage for a very large program. The native code compilers run faster at the expense of less efficient use of memory. OmegaSoft's relocatable assembler gives it the edge in memory usage efficiency over Lucidata for small programs. TSC is king for speed or accuracy of floating point calculations (not necessarily both at the same time). TSC's compiler is simple to use but long in execution time. Lucidata and OmegaSoft both allow "binding" the user program and the runtime package into a single binary file complete with transfer address so that it runs like a .CMD file. In this runnable form, a program produced by either of these compilers may be sold or exchanged with someone else, regardless of whether that person owns the compiler, without violation of the license agreement. The purchase of Dynasoft's complete package including the source listing of the interpreter, also conveys a license to supply the compiler output and runtime object code to a third party. It is possible to link the code from each of these compilers to assembler code routines for handling such things as printer and hardware I/O drivers (for solid state relays, A/D converters, etc.).

LINKING LOADER /09 final

6-13-81 TSC ASSEMBLER
AUTHOR: HL HARKNESS, PLACED IN PUBLIC DOMAIN, 1981.

```

0000
.....MODULE 'NTERPS' - RLOAD VERS 2.0
* INTERPASS PROCESS
* IN THE FINAL VERSION, THIS MODULE WILL PRODUCE A
* SORTED SYMBOL TABLE LISTING AND
* WILL POINT OUT UNDEFINED EXTERNALS. IN THE INTEREST
* OF BREVITY AND TIME, THE INITIAL (BOOTSTRAP) VERSION
* WILL MERELY DUMP THE TABLE.

0000 ENT NTERPS
0000 EXT SYMMEND
0000 EXT SYMTAB
0000 EXT SORT

0006 *
0006 EXT PSTNG
0006 EXT OUTHEX
0006 EXT PCRLF

0006 SLEN EQU $6 STRING LENGTH
0006 RELEN EQU $8 ENTRY LENGTH
0006 EQUALS EQU $30 =SIGN

000C NTERPS EQU [PCRLF,PCRI]
000C AD 9C FB JSR MSD,PCRI
000C 38 80 W58 LEAX [PSTNG,PCRI]
000C AD 9C FB JSR [PCRLF,PCRI]
000C AD 9C F1 JSR [PCRLF,PCRI]

0019 * SORT THE SYMBOL TABLE
0019 AE 8C E6 LDJ SYMTAB,PCRI
0019 36 18 PSHU X
0019 AE 9C DF LDJ [SYMMEND,PCRI]
0019 36 18 PSHU X
0023 86 08 LDA #RELEN
0023 36 02 PSHU A
0023 86 00 LDA #0
0023 36 02 PSHU A
0023 86 05 LDA #SLEN-1
0023 36 02 PSHU A
0023 AD 9C D2 JSR [SORT,PCRI]

0032 * PRINT THE SYMBOL TABLE
0032 AE 8C CD LDJ SYMTAB,PCRI
0032 36 18 PRSYM EQU X
0032 31 80 LEAY STRING,PCRI
0032 C6 86 LDB #SLEN

0030 * COPY THE SYMBOL TO OUTPUT BUFFER
0030 A6 80 EQU X
0030 A7 A0 LDA .Y+
0030 5A DEC .Y+
0030 26 F9 DNE COPY

NTERPS
AUTHOR: HL HARKNESS, PLACED IN PUBLIC DOMAIN, 1981.

```

```

6-13-81 TSC ASSEMBLER
AUTHOR: HL HARKNESS, PLACED IN PUBLIC DOMAIN, 1981.

* TERMINATE THE STRING
0044 86 3D LDA #EQUALS
0044 A7 A0 STA .Y+
0044 86 04 LDA #EOS
0044 A7 A0 STA .Y
0044 38 80 LEAX STRING,PCRI
0044 AD 9C B3 JSR [PSTNG,PCRI]

* GET THE ADDRESS OF THE SYMBOL
0053 37 18 RALL
0053 C6 06 LDB #SLEN
0053 3A 81 ABX
0053 AD 9C AD JSR [OUTHEX,PCRI]
0053 38 81 LEAX .X
0053 AD 9C AB JSR [OUTHEX,PCRI]
0053 38 81 LEAX .X
0053 AC 9C 9B CMPLX [SYMMEND,PCRI] IF THERE IS ONE
0053 20 CE BLT PRSYM

0067 AD 9C A0 JSR [PCRLF,PCRI]

006A 39 RTS

MSG FCC '....SYMBOL TABLE.....EOS'

STRING RMB $8

ENDMOD
END

```

0 ERROR(S) DETECTED

6-13-81 TSC ASSEMBLER
AUTHOR: HL HARKNESS, PLACED IN PUBLIC DOMAIN, 1981.

```

.....MODULE 'OSLINK' - RLOAD VERS 2.0
* FLEX ROUTINE DEFINITIONS

0000 ABS FLEX
0000 ABS GETCHR
0000 ABS GETFIL
0000 ABS SETEXT
0000 ABS OUTDEC
0000 ABS OUTHEX
0000 ABS PCRLF
0000 ABS PSTNG
0000 ABS PUTCHR
0000 ABS RPTERR

* FLEX ADDRESSES

0000 ABS OUTSWC
0000 ABS INPSWC
0000 ABS FLOUT
0000 ABS FILINP
0000 ABS FLADDR
0000 ABS MEMEND
0000 ABS SYSFCB

```

```

* FMS DEFINITIONS
0000      ABS      FMSCLS
0000      FMS

```

THE USER STACK SPACE IS SET TO PAGE 0. THIS IS SO THAT
OVERFLOW WILL BE OBVIOUS WHEN THE PUSHED VALUE ZAPS THE
GAT RAM.

```

0000      ENT      STACK      INPUT FCB
0000      ENT      RDCFB      OUTPUT FCB
0000      ENT

```

```

* FLEX ROUTINE DEFINITIONS
CD03      FLEX      EQU      $CD03
CD15      GETCHR      EQU      $CD15
CD20      GETFIL      EQU      $CD20
CD33      SETEXT      EQU      $CD33
CD39      OUTDEC      EQU      $CD39
CD3C      OUTHEX      EQU      $CD3C
CD24      PDRLE      EQU      $CD24
CD1E      PSTRNG      EQU      $CD1E
CD18      PUTCHR      EQU      $CD18
CD3F      RPTERR      EQU      $CD3F

```

```

* FLEX ADDRESSES
CC22      OUTSWC      EQU      $CC22
CC23      INPSWC      EQU      $CC23
CC24      FILOUT      EQU      $CC24
CC26      FILINP      EQU      $CC26
CC1B      FLADDR      EQU      $CC1B
CC2B      MEMEND      EQU      $CC2B
CBA0      SYSFCB      EQU      $CBA0

```

```

* FMS DEFINITIONS
D403      FMSCLS      EQU      $D403
D406      FMS          EQU      $D406      FILE MANAGER CALL ADDRESS

```

```

* RESERVE STACK SPACE
0000      0100      STACK      RMB      256
0100      0240      02      00      01
0240      43      4F      52      45
0248      46      49      4C      45
024C      43      40      44
024F
0300      0000      305
0300      0000      END

```

0 ERROR(S) DETECTED

PASS1 6-13-81 TSC ASSEMBLER
AUTHOR: HL HARKNESS. PLACED IN PUBLIC DOMAIN, 1981.

```

0000      MODULE 'PASS1' - RLOAD VERS 2.0
* FIRST PASS OF RELOCATING LOADER. PREPARES ENTRY POINT
* TABLE AND LOAD MAP.
* INPUT RX=LINK FILE FCB POINTER
* OUTPUT RX PRESERVED
ENT      PASS1      PROCESS ABSOLUTE
EXT      ABSPRO      PROCESS EXTERNAL
EXT      EXTPRO      PROCESS EXTERNAL
EXT      GETNAM      GET MODULE NAME
EXT      RDBNRC      READ BINARY RECORD
EXT      SYMEND      SYMEND
EXT      SYMTAB

```

```

* FMS
EXT      FMS
EXT      PSTRNG
EXT      OUTHEX
* PASS1
0014      AF      0D      0114      EQU      LINKF,PCR SAVE THE LINK FILE FCB ADDRESS
0018      AF      0C      0118      EQU      SYMTAB,PCR
001B      AF      9C      011B      EQU      SYMEND,PCR
* GET THE NEXT FILE IN THE LINK
NAME      EQU      LINKF,PCR
LDR      GETNAM,PCR
JSR      #DEF
LDR      EXIT
LDR      DONE!
LDR      #ERR
LDR      ERROR
* SAVE BINARY FILE FCB
STX      BINF,PCR
* UPDATE THE MODULE BASE ADDRESS FOR RELOCATING
* NEW BASE = OLD END
LDR      MEMO,PCR
STX      MBASE,PCR
* GET THE NEXT BINARY RECORD INTO THE BUFFER
GETREC      EQU      BINF,PCR
LDR      BUF,PCR
LDR      (RDBNRC,PCR)
JSR      #ERR
REQ      NXTFIL
CMPA      #DEF
BNE      PRICREC
THE BINARY FILE, THEN GET THE NEXT ONE
LDR      #FCLOSE
STA      FUNCTN,X
JSR      (FMS,PCR)
BRA      NAME

```

A NEW BINARY RECORD RESIDES IN BUFR

```

PRICREC      EQU      BUF,PCR
LEAY      Y+
LDA      #RSTX
REQ      SPCCHK
* RECORD IS NOT AN $02 RECORD, CHECK FOR XFER RECORD.
CMPA      #RTRX
LBNE      ERROR
* RECORD IS XFER RECORD.
LDR      MBASE,PCR
STD      XFER,PCR
LEAX      MSG,PCR
JSR      (PSTRNG,PCR)
LEAX      XFER,PCR
JSR      (OUTHEX,PCR)
LEAX      1,X

```

```

0083      AD      9C      8C      JSR      (OUTHEX,PCR)
0086      20      85      GETREC
* CHECK FOR SPECIAL LINKAGE RECORDS
0088      EQU      SPCCHK
LDR      Y++
CMPA      #EXTORG
BNE      EXTORG
JSR      (EXTPRO,PCR)
BRA      NEXT
0096      1083      FFF2      ENTCHK
009A      26      0A      CMPA      #EXTORG
009C      AE      8D      0107      BNE      ABSCHK
00A0      AD      9D      FF5E      LDR      MBASE,PCR
00A4      20      5A      JSR      (EXTPRO,PCR)
00A6      EQU      NEXT
00A6      1083      FFF3      ABSCHK
00AA      26      06      CMPA      #ABSORG
00AC      AD      9D      FF50      BNE      NAMCHK
00B0      20      4E      JSR      (ABSPRO,PCR)
00B2      1083      FFF0      NAMCHK
00B6      26      48      CMPA      #MODORG
00B8      31      21      BNE      NEXT
00BA      EC      A1      LEAY      1,X
00BC      ED      8D      00E5      LDR      Y++
00C0      1F      21      STD      LENGTH,PCR
TFR      Y,X
* REPORT LENGTH IN LOAD MAP
00C2      AD      9D      FF4A      JSR      (PSTRNG,PCR)
00C6      30      80      00E1      LEAX      NAMMSG,PCR
00CA      AD      9D      FF42      JSR      (PSTRNG,PCR)
00CE      30      80      00D3      LEAX      LENGTH,PCR
00D2      AD      9D      FF3C      JSR      (OUTHEX,PCR)
00D6      30      01      LEAX      1,X
00D8      AD      9D      FF36      JSR      (OUTHEX,PCR)
* UPDATE THE END-OF-MODULE ADDRESS
* (END=BEGINNING+LENGTH)
00DC      30      80      007D      LEAX      BASMSG,PCR
00E0      AD      9D      FF2C      JSR      (PSTRNG,PCR)
00E4      30      80      00BF      LEAX      MBASE,PCR
00E8      AD      9D      FF26      JSR      (OUTHEX,PCR)
00EC      30      01      LEAX      1,X
00EE      AD      9D      FF20      JSR      (OUTHEX,PCR)
00F2      EC      8D      00AF      LDR      LENGTH,PCR
00F6      E3      8D      00AD      ADDD      MBASE,PCR
00FA      ED      8D      00AB      STD      MEMO,PCR
00FE      86      81      LDA      #OK

```

```

0100      01      82      NEXT      EQU      #ERR
0102      1026      FF37      CMPA      LBNE      GETREC
* ERROR, CLOSE FILE BEFORE RETURNING
0106      AE      8D      0097      LDR      BINF,PCR
010A      86      84      LDR      #FCLOSE
010C      A7      84      STA      FUNCTN,X
010E      AD      9D      FEFC      JSR      (FMS,PCR)
0112      AE      8D      0112      EQU      LINKF,PCR
0116      39      8D      008D      LDR      RTS

```

```

0117      30      8D      0013      ERROR      EQU      ERRMSG,PCR
0118      AD      9D      FEFF      JSR      (PSTRNG,PCR)
011F      AE      8D      007E      LDR      BINF,PCR
0123      86      84      LDR      #FCLOSE
0125      A7      84      STA      FUNCTN,X
0127      AD      9D      FEE3      JSR      (FMS,PCR)
012B      16      FEFF      LDR      NAME
012E      25      4E      52      45      FCC      'UNRECOGNIZABLE BINARY RECORD'
0132      43      4F      4E
0136      49      5A      41      42
013A      4C      45      20      42
013E      49      4E      41      52
0142      59      20      52      45
0146      43      4F      52      44
014A      20      46      4F      55
014E      4E      44      20      42
0152      59      20      50      41
0156      53      53      20      4F
015A      4E      45      84
015D      20      20      20      20
0161      20      20      20      42
0165      65      67      69      6E
0169      6E      69      6E      67
016D      20      61      64      64
0171      72      65      73      73
0175      30      04

```

```

0177      2A      2A      2A      2A      MSG      FCC      '*****'
017B      2A      2A      20      20
017F      20      20      20      20
0183      20      20      20      20
0187      20      20      20      20
018B      56      72      61      6E      FCC      'TRANSFER ADDRESS',EOS
0191      73      66      65      72
0195      20      61      64      64
0199      72      65      73      73
019D      30      04

```

```

019F      EQU      XFER      2
01A1      EQU      BINF      RMB      2
01A3      EQU      LINKF      RMB      2
01A5      EQU      LENGTH      RMB      2
01A7      EQU      MBASE      FDB      0
01A9      EQU      MEMO      FDB      0
01AB      20      20      20      20      NAMMSG      FCC      'LENGTH',EOS
01AF      20      20      20      4C
01B3      65      6E      67      74
01B7      68      30      04

```

```

01BA      EQU      BUF      RMB      260
02BE      EQU      ENMOD      END

```

0 ERROR(S) DETECTED

PASS2 6-13-81 TSC ASSEMBLER
AUTHOR: HL HARKNESS. PLACED IN PUBLIC DOMAIN, 1981.

```

0000      MODULE 'PASS2' - RLOAD VERS 2.0
* SECOND PASS OF RELOCATING LOADER.
* BUILDS CORE IMAGE ON DISK.
* INPUT RX=LINK FILE FCB POINTER
ENT      PASS2
EXT      EXT2      PROCESS EXTERNAL
EXT      GETNAM      GET MODULE NAME
EXT      RDBNRC      READ BINARY RECORD
EXT      WRNRC      WRITE BINARY RECORD
EXT      WRFCB

```

```

000A EXT PSTING
000C PCRLF
000E FMS
0010 RPTERR
0012 FMSCLS
0014 FLEX

0016 AF 80 0016 PASS2 EQU *
0017 011B STX LINKF,PCOR SAVE THE LINK FILE FCB ADDRESS

001A AD 9C EF JSR (PCOR,F,PCOR)
001B 80 001B MSG,PCOR
001C 9C E6 JSR (PSTRNG,PCOR)

* OPEN CORE FILE
0024 AE 8C E1 LDX WFCB,PCOR
0025 AD 9C E4 JSR (FMS,PCOR)
0026 1026 0006 FATAL
0027 86 FF LDR #NREAD
0028 A7 88 38 STA COMPFL,X

* GET THE NEXT FILE IN THE LINK
0033 AE 80 0033 NAME EQU *
0034 AD 9C C8 LDX LINKF,PCOR
0035 81 0035 JSR (GETNAM,PCOR)
0036 1027 0003 CMPA #ERR
0037 81 82 LBQ EXIT DONE!
0038 1027 000F LBQ ERROR

* SAVE BINARY FILE FCB
0046 AF 80 0046 STX BINF,PCOR

* UPDATE THE MODULE BASE ADDRESS FOR RELOCATING
004A AE 80 004A LDX MEND,PCOR
004B AF 80 004B STX MBASE,PCOR

* GET THE NEXT BINARY RECORD INTO THE BUFFER
0052 AE 80 0052 GETREC EQU *
0053 AD 9C C8 LDX BINF,PCOR
0054 81 0054 JSR (BUFR,PCOR)
0055 AD 9C A7 JSR (RDBNRC,PCOR)
0056 81 82 CMPA #ERR
0057 27 04 BEQ NXTFIL
0058 81 00 BEQ #CLOS
0059 26 09 BNE PROCREC

* CLOSE THE BINARY FILE, THEN GET THE NEXT ONE
0065 AE 80 0065 NXTFIL EQU *
0066 AD 9C A2 LDX #CLOS
0067 81 00 STA FUNCTN,X
0068 26 09 BRA NAME

* A NEW BINARY RECORD RESIDES IN BUFR
0069 81 00 PROCREC EQU *
0070 26 09 LDX BUFR,PCOR
0071 81 00 LDR #Y+
0072 27 04 CMPA #RSTX BEGINNING OF RECORD
0073 27 04 BEQ SPCCHK

* RECORD IS XFER RECORD. RELOCATE IT.
0074 81 00 LDX MBASE,PCOR
0075 27 04 ADDO #Y
0076 27 04 STD #Y
0077 81 00 LDX WFCB,PCOR
0078 27 04 LEAY BUFR,PCOR
0079 81 00 JSR (RDBNRC,PCOR)
0080 27 04 BRA GETREC

* CHECK FOR SPECIAL LINKAGE RECORDS
0080 EC A1 SPCCHK EQU *
0081 1083 FFF1 LDR #Y++
0082 26 08 CMPD #EXTORG
0083 AD 90 FF67 BNE ENTCHK
0084 81 82 CMPA #EXT2,PCOR
0085 27 04 BEQ NEXT
0086 27 04 BRA REGREC IF NOT ERR, THEN LINK RECORD
0087 20 28 EQU *
0088 1083 FFF2 ENTCHK EQU *
0089 27 04 CMPD #ENTORG
0090 27 04 BEQ NEXT PASS 2 DOESN'T USE ENT RECORDS
0091 27 04 EQU *
0092 1083 FFF3 NAMCHK EQU *
0093 27 04 FIRST, CHECK FOR ABSOLUTE, WHICH IS NOT USED IN PASS 2
0094 1083 FFF3 CMPD #ABSORG
0095 27 04 BEQ NEXT
0096 1083 FFF3 CMPD #MODORG
0097 26 08 BNE REGREC
0098 31 21 LEAY #Y+ SKIP BYTE COUNT (DON'T NEED IT)
0099 EC A1 LDR #Y++ GET MODULE LENGTH

* UPDATE THE END-OF-MODULE ADDRESS
0099 E3 80 0099 ADDO MBASE,PCOR
009A ED 80 009A STD MEND,PCOR
009B 20 31 BRA NEXT

* RELOCATE REGULAR RECORD.
009F 31 80 009F REGREC EQU *
00A0 27 04 LEAY BUFR,PCOR
00A1 EC 21 LDR #Y
00A2 E3 80 00A2 ADDO MBASE,PCOR
00A3 ED 21 STD #Y
00A4 AE 80 00A4 LDX WFCB,PCOR
00A5 AD 90 FF33 JSR (RDBNRC,PCOR)
00A6 20 1B BRA NEXT

* ERROR
00D5 AE 80 00D5 ERROR EQU *
00D6 86 04 LDX BINF,PCOR
00D7 A7 84 LDR #CLOS
00D8 AD 90 FF20 STA FUNCTN,X
00D9 16 FF4F JSR (FMS,PCOR)

* FAILURE TO OPEN CORE IMAGE FILE
00E4 AD 90 FF28 FATAL EQU *
00E5 86 90 FF26 JSR (RPTERR,PCOR)
00E6 62 90 FF24 JSR (FMSCLS,PCOR)
00E7 62 90 FF24 JMP (FLEX,PCOR)

* NEXT
00F0 16 FF2F NEXT EQU *
00F1 86 FF2F LDR #Y
00F2 86 FF2F EXIT EQU *
00F3 86 FF2F CLOSE EQU *
00F4 86 FF2F CORE EQU *
00F5 86 FF2F IMAGE EQU *
00F6 86 FF2F FILE EQU *
00F7 86 FF2F LDX WFCB,PCOR
00F8 86 FF2F LDR #CLOS
00F9 86 FF2F STA FUNCTN,X
00FA 86 FF2F JSR (FMS,PCOR)

* LEAY
00F7 86 FF2F LEAY JSR (MSG1,PCOR)
00F8 86 FF2F JSR (PSTRNG,PCOR)

* RESTORE ORIGINAL RX CONTENTS
00F8 AE 80 00F8 LDX LINKF,PCOR
00F9 86 39 RTS

MSG FCC '--- PASS TWO ---'.EOS
MSG1 FCC '--- LOAD COMPLETE ---'.EOS

```

```

0120 45 20 20 20
0131 20 84
0133
0135
0137 0000
0139 0000
0140
023F

```



ROBRC AUTHOR: M. HARDNESS. PLACED IN PUBLIC DOMAIN, 1981.

6-13-81 TSC ASSEMBLER

```

0000 ***** MODULE 'ROBRC' - LOAD VERS 2.0 *****
* RETURN A (LOGICAL) BINARY RECORD
* INPUTS - RX=FCB ADDR OF OPEN BINARY FILE
*          RY=BUFFER ADDRESS
* OUTPUTS - X,Y PRESERVED

0000 ENT ROBRC EQU *
0001 EXT FMS
0002 EXT PSTING
0003 EXT RPTERR

0006 36 20 0006 RDBNRC EQU *
* GET RECORD HEADER.
* THERE ARE TWO TYPES OF BINARY RECORDS IN FLEX,
* REGULAR RECORD (002), AND TRANSFER RECORD (003).
* DETAILED EXPLANATION IN ADVANCED PROGRAMMER'S
* GUIDE PUT OUT BY TSC.

0008 9C F5 SRCH EQU *
0009 26 3F JSR (FMS,PCOR)
0010 81 02 BNE CAN
0011 26 1E CMPA #RSTX
0012 26 1E BNE RTRXCH CHECK FOR OTHER TYPE
* A REGULAR RECORD HEADER IS FOUND.
* COPY ENTIRE RECORD TO BUFFER. (4 BYTES IN HEADER)

0011 A7 00 LDB #Y+
0012 C6 03 LDB #Y+
0013 03 03 EQU *
0014 9C E8 JSR (FMS,PCOR)
0015 26 32 BNE CANT
0016 A7 00 STA #Y+
0017 26 32 BNE HORCNT
0018 26 32 BNE HORCNT
0019 26 32 BNE HORCNT
0020 26 32 BNE HORCNT
* RECORD BYTE COUNT NOW IN RA, USE FOR REST OF RECORD

001F 1F 89 BCOPY EQU *
0020 26 32 JSR (FMS,PCOR)
0021 AD 9C DC LDR #Y+
0022 26 32 BNE CANT
0023 26 32 STA #Y+
0024 26 32 BNE BCOPY
0025 26 32 LDR #Y+
0026 26 32 BNE BCOPY
0027 26 32 LDR #Y+
0028 26 32 BNE BCOPY
0029 26 32 LDR #Y+
0030 26 32 BNE BCOPY
0031 26 32 LDR #Y+
0032 26 32 BNE BCOPY
0033 26 32 LDR #Y+
0034 26 32 BNE BCOPY
0035 26 32 LDR #Y+
0036 26 32 BNE BCOPY
0037 26 32 LDR #Y+
0038 26 32 BNE BCOPY
0039 26 32 LDR #Y+
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0054 26 32 BNE BCOPY
0055 26 32 LDR #Y+
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0059 26 32 LDR #Y+
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0070 26 32 BNE BCOPY
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0072 26 32 BNE BCOPY
0073 26 32 LDR #Y+
0074 26 32 BNE BCOPY
0075 26 32 LDR #Y+
0076 26 32 BNE BCOPY
0077 26 32 LDR #Y+
0078 26 32 BNE BCOPY
0079 26 32 LDR #Y+
0080 26 32 BNE BCOPY
0081 26 32 LDR #Y+
0082 26 32 BNE BCOPY
0083 26 32 LDR #Y+
0084 26 32 BNE BCOPY
0085 26 32 LDR #Y+
0086 26 32 BNE BCOPY
0087 26 32 LDR #Y+
0088 26 32 BNE BCOPY
0089 26 32 LDR #Y+
0090 26 32 BNE BCOPY
0091 26 32 LDR #Y+
0092 26 32 BNE BCOPY
0093 26 32 LDR #Y+
0094 26 32 BNE BCOPY
0095 26 32 LDR #Y+
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0112 26 32 BNE BCOPY
0113 26 32 LDR #Y+
0114 26 32 BNE BCOPY
0115 26 32 LDR #Y+
0116 26 32 BNE BCOPY
0117 26 32 LDR #Y+
0118 26 32 BNE BCOPY
0119 26 32 LDR #Y+
0120 26 32 BNE BCOPY
0121 26 32 LDR #Y+
0122 26 32 BNE BCOPY
0123 26 32 LDR #Y+
0124 26 32 BNE BCOPY
0125 26 32 LDR #Y+
0126 26 32 BNE BCOPY
0127 26 32 LDR #Y+
0128 26 32 BNE BCOPY
0129 26 32 LDR #Y+
0130 26 32 BNE BCOPY
0131 26 32 LDR #Y+
0132 26 32 BNE BCOPY
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0135 26 32 LDR #Y+
0136 26 32 BNE BCOPY
0137 26 32 LDR #Y+
0138 26 32 BNE BCOPY
0139 26 32 LDR #Y+
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0142 26 32 BNE BCOPY
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0144 26 32 BNE BCOPY
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0146 26 32 BNE BCOPY
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0196 26 32 BNE BCOPY
0197 26 32 LDR #Y+
0198 26 32 BNE BCOPY
0199 26 32 LDR #Y+
0200 26 32 BNE BCOPY
0201 26 32 LDR #Y+
0202 26 32 BNE BCOPY
0203 26 32 LDR #Y+
0204 26 32 BNE BCOPY
0205 26 32 LDR #Y+
0206 26 32 BNE BCOPY
0207 26 32 LDR #Y+
0208 26 32 BNE BCOPY
0209 26 32 LDR #Y+
0210 26 32 BNE BCOPY
0211 26 32 LDR #Y+
0212 26 32 BNE BCOPY
0213 26 32 LDR #Y+
0214 26 32 BNE BCOPY
0215 26 32 LDR #Y+
0216 26 32 BNE BCOPY
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0218 26 32 BNE BCOPY
0219 26 32 LDR #Y+
0220 26 32 BNE BCOPY
0221 26 32 LDR #Y+
0222 26 32 BNE BCOPY
0223 26 32 LDR #Y+
0224 26 32 BNE BCOPY
0225 26 32 LDR #Y+
0226 26 32 BNE BCOPY
0227 26 32 LDR #Y+
0228 26 32 BNE BCOPY
0229 26 32 LDR #Y+
0230 26 32 BNE BCOPY
0231 26 32 LDR #Y+
0232 26 32 BNE BCOPY
0233 26 32 LDR #Y+
0234 26 32 BNE BCOPY
0235 26 32 LDR #Y+
0236 26 32 BNE BCOPY
0237 26 32 LDR #Y+
0238 26 32 BNE BCOPY
0239 26 32 LDR #Y+
0240 26 32 BNE BCOPY
0241 26 32 LDR #Y+
0242 26 32 BNE BCOPY
0243 26 32 LDR #Y+
0244 26 32 BNE BCOPY
0245 26 32 LDR #Y+
0246 26 32 BNE BCOPY
0247 26 32 LDR #Y+
0248 26 32 BNE BCOPY
0249 26 32 LDR #Y+
0250 26 32 BNE BCOPY
0251 26 32 LDR #Y+
0252 26 32 BNE BCOPY
0253 26 32 LDR #Y+
0254 26 32 BNE BCOPY
0255 26 32 LDR #Y+
0256 26 32 BNE BCOPY
0257 26 32 LDR #Y+
0258 26 32 BNE BCOPY
0259 26 32 LDR #Y+
0260 26 32 BNE BCOPY
0261 26 32 LDR #Y+
0262 26 32 BNE BCOPY
0263 26 32 LDR #Y+
0264 26 32 BNE BCOPY
0265 26 32 LDR #Y+
0266 26 32 BNE BCOPY
0267 26 32 LDR #Y+
0268 26 32 BNE BCOPY
0269 26 32 LDR #Y+
0270 26 32 BNE BCOPY
0271 26 32 LDR #Y+
0272 26 32 BNE BCOPY
0273 26 32 LDR #Y+
0274 26 32 BNE BCOPY
0275 26 32 LDR #Y+
0276 26 32 BNE BCOPY
0277 26 32 LDR #Y+
0278 26 32 BNE BCOPY
0279 26 32 LDR #Y+
0280 26 32 BNE BCOPY
0281 26 32 LDR #Y+
0282 26 32 BNE BCOPY
0283 26 32 LDR #Y+
0284 26 32 BNE BCOPY
0285 26 32 LDR #Y+
0286 26 32 BNE BCOPY
0287 26 32 LDR #Y+
0288 26 32 BNE BCOPY
0289 26 32 LDR #Y+
0290 26 32 BNE BCOPY
0291 26 32 LDR #Y+
0292 26 32 BNE BCOPY
0293 26 32 LDR #Y+
0294 26 32 BNE BCOPY
0295 26 32 LDR #Y+
0296 26 32 BNE BCOPY
0297 26 32 LDR #Y+
0298 26 32 BNE BCOPY
0299 26 32 LDR #Y+
0300 26 32 BNE BCOPY
0301 26 32 LDR #Y+
0302 26 32 BNE BCOPY
0303 26 32 LDR #Y+
0304 26 32 BNE BCOPY
0305 26 32 LDR #Y+
0306 26 32 BNE BCOPY
0307 26 32 LDR #Y+
0308 26 32 BNE BCOPY
0309 26 32 LDR #Y+
0310 26 32 BNE BCOPY
0311 26 32 LDR #Y+
0312 26 32 BNE BCOPY
0313 26 32 LDR #Y+
0314 26 32 BNE BCOPY
0315 26 32 LDR #Y+
0316 26 32 BNE BCOPY
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0318 26 32 BNE BCOPY
0319 26 32 LDR #Y+
0320 26 32 BNE BCOPY
0321 26 32 LDR #Y+
0322 26 32 BNE BCOPY
0323 26 32 LDR #Y+
0324 26 32 BNE BCOPY
0325 26 32 LDR #Y+
0326 26 32 BNE BCOPY
0327 26 32 LDR #Y+
0328 26 32 BNE BCOPY
0329 26 32 LDR #Y+
0330 26 32 BNE BCOPY
0331 26 32 LDR #Y+
0332 26 32 BNE BCOPY
0333 26 32 LDR #Y+
0334 26 32 BNE BCOPY
0335 26 32 LDR #Y+
0336 26 32 BNE BCOPY
0337 26 32 LDR #Y+
0338 26 32 BNE BCOPY
0339 26 32 LDR #Y+
0340 26 32 BNE BCOPY
0341 26 32 LDR #Y+
0342 26 32 BNE BCOPY
0343 26 32 LDR #Y+
0344 26 32 BNE BCOPY
0345 26 32 LDR #Y+
0346 26 32 BNE BCOPY
0347 26 32 LDR #Y+
0348 26 32 BNE BCOPY
0349 26 32 LDR #Y+
0350 26 32 BNE BCOPY
0351 26 32 LDR #Y+
0352 26 32 BNE BCOPY
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0380 26 32 BNE BCOPY
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0384 26 32 BNE BCOPY
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0386 26 32 BNE BCOPY
0387 26 32 LDR #Y+
0388 26 32 BNE BCOPY
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0601 26 32 LDR #Y+
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0604 26 32 BNE BCOPY
0605 26 32 LDR #Y+
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0635 26 32 LDR #Y+
0636 26 32 BNE BCOPY
0637 26 32 LDR #Y+
0638 26 32 BNE BCOPY
0639 26 32 LDR #Y+
064
```



```

MODULE MACRO
CTR    EQU 0
MODORG EQU 0
END-CTR EQU 0
FCC    EQU 0
CTR    EQU 0
END

* LINKAGE MACROS. THESE PROVIDE THE LOADER WITH
* THE TYPE OF LINKAGE, AND IN SOME CASES, PROVIDE
* LINK WORDS.

ABS    MACRO
ENDCTR EQU 0
ORG    ABSORG
FCC    EQU 0
CTR    EQU 0
ENDM

EXT    MACRO
ENDCTR EQU 0

```

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```

ORG EXTORG
CTR EQU 0
FCC EQU 0
CTR EQU 0
ENDM

*
INT    MACRO
ENDCTR EQU 0
ORG INTORG
FCC EQU 0
CTR EQU 0
ENDM

```

- ORIGIN POINTS
- THESE ORIGIN POINTS INTO ROM. THEY ARE USED BY THE
- LINKING LOADER AS TAGS FOR THE SPECIAL RECORDS
- GENERATED BY THE MODULE AND LINK MACROS.

```

FFFF EQU 0
FFF1 EQU 0
FFF2 EQU 0
FFF3 EQU 0

```

- INSERT FILE: LDRDEF
- LOADER DEFINITIONS
- THESE DEFINITIONS ARE PURELY FOR CONVENIENCE.
- CONTROL CODES AND STATUS VALUES HAVE THE MSB SET.
- I.E., VALUES FROM 128-255, EXCEPTIONS TO THIS
- CONVENTION ARE THOSE CONTROL CODES WHICH ARE ALREADY
- DEFINED IN FLEX (EQU \$84, ETC.).

```

002C COMMA EQU $2C
0030 OR EQU $30
0034 CDS EQU $34
0038 CDS EQU $38
003C EQU $3C
0040 EQU $40
0044 EQU $44
0048 EQU $48
004C EQU $4C
0050 EQU $50
0054 EQU $54
0058 EQU $58
005C EQU $5C
0060 EQU $60
0064 EQU $64
0068 EQU $68
006C EQU $6C
0070 EQU $70
0074 EQU $74
0078 EQU $78
007C EQU $7C
0080 EQU $80
0084 EQU $84
0088 EQU $88
008C EQU $8C
0090 EQU $90
0094 EQU $94
0098 EQU $98
009C EQU $9C
00A0 EQU $A0
00A4 EQU $A4
00A8 EQU $A8
00AC EQU $AC
00B0 EQU $B0
00B4 EQU $B4
00B8 EQU $B8
00BC EQU $BC
00C0 EQU $C0
00C4 EQU $C4
00C8 EQU $C8
00CC EQU $CC
00D0 EQU $D0
00D4 EQU $D4
00D8 EQU $D8
00DC EQU $DC
00E0 EQU $E0
00E4 EQU $E4
00E8 EQU $E8
00EC EQU $EC
00F0 EQU $F0
00F4 EQU $F4
00F8 EQU $F8
00FC EQU $FC

```

START-OF-BINARY-RECORD
START-OF-BINARY-TRANSFER-RECORD

INSERT FILE: FCDEF

- GLOBAL DEFINITIONS FROM TSC SYSTEMS

```

0000 FUNCTION EQU 0
0001 ERRSTAT EQU 1
0002 OFFLAG EQU 2
0003 DRIVE EQU 3
0004 FNAME EQU 4
0005 COMFPL EQU 5
0006 BREAD EQU 6
0007 EQU 7
0008 EQU 8
0009 EQU 9
000A EQU 10
000B EQU 11
000C EQU 12
000D EQU 13
000E EQU 14
000F EQU 15
0010 EQU 16
0011 EQU 17
0012 EQU 18
0013 EQU 19
0014 EQU 20
0015 EQU 21
0016 EQU 22
0017 EQU 23
0018 EQU 24
0019 EQU 25
001A EQU 26
001B EQU 27
001C EQU 28
001D EQU 29
001E EQU 30
001F EQU 31
0020 EQU 32
0021 EQU 33
0022 EQU 34
0023 EQU 35
0024 EQU 36
0025 EQU 37
0026 EQU 38
0027 EQU 39
0028 EQU 40
0029 EQU 41
002A EQU 42
002B EQU 43
002C EQU 44
002D EQU 45
002E EQU 46
002F EQU 47
0030 EQU 48
0031 EQU 49
0032 EQU 50
0033 EQU 51
0034 EQU 52
0035 EQU 53
0036 EQU 54
0037 EQU 55
0038 EQU 56
0039 EQU 57
003A EQU 58
003B EQU 59
003C EQU 60
003D EQU 61
003E EQU 62
003F EQU 63
0040 EQU 64
0041 EQU 65
0042 EQU 66
0043 EQU 67
0044 EQU 68
0045 EQU 69
0046 EQU 70
0047 EQU 71
0048 EQU 72
0049 EQU 73
004A EQU 74
004B EQU 75
004C EQU 76
004D EQU 77
004E EQU 78
004F EQU 79
0050 EQU 80
0051 EQU 81
0052 EQU 82
0053 EQU 83
0054 EQU 84
0055 EQU 85
0056 EQU 86
0057 EQU 87
0058 EQU 88
0059 EQU 89
005A EQU 90
005B EQU 91
005C EQU 92
005D EQU 93
005E EQU 94
005F EQU 95
0060 EQU 96
0061 EQU 97
0062 EQU 98
0063 EQU 99
0064 EQU 100
0065 EQU 101
0066 EQU 102
0067 EQU 103
0068 EQU 104
0069 EQU 105
006A EQU 106
006B EQU 107
006C EQU 108
006D EQU 109
006E EQU 110
006F EQU 111
0070 EQU 112
0071 EQU 113
0072 EQU 114
0073 EQU 115
0074 EQU 116
0075 EQU 117
0076 EQU 118
0077 EQU 119
0078 EQU 120
0079 EQU 121
007A EQU 122
007B EQU 123
007C EQU 124
007D EQU 125
007E EQU 126
007F EQU 127
0080 EQU 128
0081 EQU 129
0082 EQU 130
0083 EQU 131
0084 EQU 132
0085 EQU 133
0086 EQU 134
0087 EQU 135
0088 EQU 136
0089 EQU 137
008A EQU 138
008B EQU 139
008C EQU 140
008D EQU 141
008E EQU 142
008F EQU 143
0090 EQU 144
0091 EQU 145
0092 EQU 146
0093 EQU 147
0094 EQU 148
0095 EQU 149
0096 EQU 150
0097 EQU 151
0098 EQU 152
0099 EQU 153
009A EQU 154
009B EQU 155
009C EQU 156
009D EQU 157
009E EQU 158
009F EQU 159
00A0 EQU 160
00A1 EQU 161
00A2 EQU 162
00A3 EQU 163
00A4 EQU 164
00A5 EQU 165
00A6 EQU 166
00A7 EQU 167
00A8 EQU 168
00A9 EQU 169
00AA EQU 170
00AB EQU 171
00AC EQU 172
00AD EQU 173
00AE EQU 174
00AF EQU 175
00B0 EQU 176
00B1 EQU 177
00B2 EQU 178
00B3 EQU 179
00B4 EQU 180
00B5 EQU 181
00B6 EQU 182
00B7 EQU 183
00B8 EQU 184
00B9 EQU 185
00BA EQU 186
00BB EQU 187
00BC EQU 188
00BD EQU 189
00BE EQU 190
00BF EQU 191
00C0 EQU 192
00C1 EQU 193
00C2 EQU 194
00C3 EQU 195
00C4 EQU 196
00C5 EQU 197
00C6 EQU 198
00C7 EQU 199
00C8 EQU 200
00C9 EQU 201
00CA EQU 202
00CB EQU 203
00CC EQU 204
00CD EQU 205
00CE EQU 206
00CF EQU 207
00D0 EQU 208
00D1 EQU 209
00D2 EQU 210
00D3 EQU 211
00D4 EQU 212
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00D6 EQU 214
00D7 EQU 215
00D8 EQU 216
00D9 EQU 217
00DA EQU 218
00DB EQU 219
00DC EQU 220
00DD EQU 221
00DE EQU 222
00DF EQU 223
00E0 EQU 224
00E1 EQU 225
00E2 EQU 226
00E3 EQU 227
00E4 EQU 228
00E5 EQU 229
00E6 EQU 230
00E7 EQU 231
00E8 EQU 232
00E9 EQU 233
00EA EQU 234
00EB EQU 235
00EC EQU 236
00ED EQU 237
00EE EQU 238
00EF EQU 239
00F0 EQU 240
00F1 EQU 241
00F2 EQU 242
00F3 EQU 243
00F4 EQU 244
00F5 EQU 245
00F6 EQU 246
00F7 EQU 247
00F8 EQU 248
00F9 EQU 249
00FA EQU 250
00FB EQU 251
00FC EQU 252
00FD EQU 253
00FE EQU 254
00FF EQU 255

```

POSITION TO RECORD N

- OPT EXP

```

0000 MODULE 'RLOAD' VERS 2.0
0001
0002
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```

- RLOAD
- LINKING LOADER FOR TSC ABSOLUTE ASSEMBLER.
- THIS PROGRAM USES INFORMATION IN SPECIAL RECORDS
- GENERATED BY THE MODULE, MAC MACROS IN ORDER TO
- ALLOW LINKING OF POSITION-INDEPENDENT MODULES.
- TO USE, ENTER THE FLEX COMMAND:
- RLOAD, (LOAD FILE) (IS THE NAME OF THE FILE WHICH
- CONTAINS THE NAMES OF THE BINARIES TO BE LOADED.
- THE INITIAL VERSION JUST PUT OUT A COMMAND FILE
- CALLED COREFILE.CMD, WHICH IS THEN RENAMED TO
- WHATEVER THE USER WANTS.

```

0000 EXT RLOAD
0001 GETFIL GET FILE NAME FROM COMMAND LINE
0002 EXT FLEX
0003 EXT FMS
0004 EXT PASS1
0005 EXT PASS2
0006 EXT PSTRNG
0007 EXT INTERPASS
0008 EXT SETEXT
0009 EXT USER
0010 EXT SYSFCB

```

```

0014 EE 8C F9
0017 AE 9C F8
001A AD 9C E3
001F AD 9C DE
0022 06 01 E7
0027 06 01 E7
0029 A7 03 01
002B 06 01 01
002D A7 0A 01
002F AD 9C D8
0032 26 1D 01
0034 AD 9C OF
0037 AD 9C D2
003A AE 8C D5
003D 06 05 05
003F A7 0A 01
0041 AD 9C BE
0044 AD 9C C1
0047 06 0A 01
0049 A7 0A 01
004B AD 9C B3
004E 06 0A 01
0051 30 80 0005
0054 AD 9C B2
0057 06 0A 01
0059 4C 49 4E 4B
005B 20 46 49 4C
005D 20 46 49 4C
005F 20 46 49 4C
0062 20 46 49 4C
0064 20 46 49 4C
0066 20 46 49 4C
0068 20 46 49 4C
006A 20 46 49 4C
006C 20 46 49 4C
006E 20 46 49 4C
0070 20 46 49 4C
0072 20 46 49 4C
0074 20 46 49 4C
0076 20 46 49 4C
0078 20 46 49 4C
007A 20 46 49 4C
007C 20 46 49 4C
007E 20 46 49 4C
0080 20 46 49 4C
0082 20 46 49 4C
0084 20 46 49 4C
0086 20 46 49 4C
0088 20 46 49 4C
008A 20 46 49 4C
008C 20 46 49 4C
008E 20 46 49 4C
0090 20 46 49 4C
0092 20 46 49 4C
0094 20 46 49 4C
0096 20 46 49 4C
0098 20 46 49 4C
009A 20 46 49 4C
009C 20 46 49 4C
009E 20 46 49 4C
00A0 20 46 49 4C
00A2 20 46 49 4C
00A4 20 46 49 4C
00A6 20 46 49 4C
00A8 20 46 49 4C
00AA 20 46 49 4C
00AC 20 46 49 4C
00AE 20 46 49 4C
00B0 20 46 49 4C
00B2 20 46 49 4C
00B4 20 46 49 4C
00B6 20 46 49 4C
00B8 20 46 49 4C
00BA 20 46 49 4C
00BC 20 46 49 4C
00BE 20 46 49 4C
00C0 20 46 49 4C
00C2 20 46 49 4C
00C4 20 46 49 4C
00C6 20 46 49 4C
00C8 20 46 49 4C
00CA 20 46 49 4C
00CC 20 46 49 4C
00CE 20 46 49 4C
00D0 20 46 49 4C
00D2 20 46 49 4C
00D4 20 46 49 4C
00D6 20 46 49 4C
00D8 20 46 49 4C
00DA 20 46 49 4C
00DC 20 46 49 4C
00DE 20 46 49 4C
00E0 20 46 49 4C
00E2 20 46 49 4C
00E4 20 46 49 4C
00E6 20 46 49 4C
00E8 20 46 49 4C
00EA 20 46 49 4C
00EC 20 46 49 4C
00EE 20 46 49 4C
00F0 20 46 49 4C
00F2 20 46 49 4C
00F4 20 46 49 4C
00F6 20 46 49 4C
00F8 20 46 49 4C
00FA 20 46 49 4C
00FC 20 46 49 4C
00FE 20 46 49 4C
00FF 20 46 49 4C

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0 ERROR(S) DETECTED

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0000 MODULE 'SCOMPR' - VERS 2.0
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0 ERROR(S) DETECTED

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0000 MODULE 'SEARCH' - RLOAD VERS 2.0
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15

* * COLOR COMPUTER Users Notes * *

by Andrew L. Nay
Rt 7 Box 298A, Madison, Al. 35903

GENERAL:

We'll start right off with a short apology this month. It's pretty obvious that I'm not using Dan Nelson's SUPER "COLOR" WRITER. He still has a couple more bugs to get worked out of the program, and has been fighting some equipment problems, causing further delays. He asked me to pass on his apologies to the people who have ordered the Wordprocessor from Nelson Software Systems; he'll get it out as soon as he can. (I'll bet there's a Murphy Law something to the effect that the fewer the "bugs" in a program, the harder they are to find.) This Editor of Color Comp is a BIG step above writing this column in BASIC, but it was not written to be a wordprocessor. I'll clean it up some "manually" this month.

QUICK LOOK: A Color Comp. "Expansion Interface"/Disk Control System

The EXATRON CCI (THING) with their "CCDOS"

I just received one of EXATRON's "THING"s yesterday with their V1.0 CCDOS. The "THING" (they are looking for a name for it - till then, we'll call it a THING) is similar to the Radio Shack TRS 80 Expansion Interface for the Model I Computer in that it contains 32K memory (yes, an additional 32K inside the supplied box) and, if purchased, the Disk Controller Board. This is housed in a blue plastic case approx. 8" by 4" by 2.5" with a 5" ribbon cable and "board edge" type connector which plugs into the cartridge slot on the COLOR COMPUTER. The memory board contains a 2K ROM-Based MONITOR called CCMDN. CCMDN provides single-key commands for displaying memory in ASCII or HEX; setting breakpoints; modify, move, or set a constant in a block of memory; go to a new location for execution; a memory test; load CCDOBI and return to BASIC from the MONITOR. CCMDN uses the dollar sign (\$) for it's prompt, leaving no doubt that you are in the Monitor. The Color Computer Interface as described sells for \$199.00.

The Disk Card presently mounts on top of the Interface Board in the box. The Controller uses the 1771 Chip with a discrete-component data separator. The PC Board Edge connector is compatible with the R.S. Model I Disk Cable, and the Controller was designed to be used with Model I Disk Operating System configurations. The present Controller will run one to four 35-track (it will work with 40-track units, but only uses 35 tracks) 5.25" Disk Drives. The Disk Card sells for \$99.00 and EXATRON prefers to set the Card up with the Interface Board at the Factory to insure proper operation.

The EXATRON Color Computer Disk Operating System (CCDOS) with a User Manual is available for \$29.95. It is supplied on a 5.25" single-density 35-track Disk. The CCDOBI syntax structure is very similar to the Model I & III TRSDOS syntax, allowing users with experience on those systems an easy conversion to CCDOBI. Disks are structured with the MUDISK Command to 256 bytes/sector, 16 sectors/track, and 35 tracks/disk, providing a total 5.25" Disk storage capability of 89,600 bytes. Track 17 is reserved for the Catalogue, leaving 879 available for use. File Storage Space is allotted in 5-sector or Half-track increments, providing 60 (maximum), the 2 Half-tracks of track 17 are used by the system 1280 byte storage locations with CCDOBI V1.0. Files are specified in the familiar "Filename.(Ext)(drive)" format where the < > symbols indicate optional entries with 1 to 8 char. filenames, 3 char. extensions preceded by the slash symbol, and a 0 to 3 drive spec. preceded by the colon when those specs are used or required. The 3 "default" Extensions used by CCDOBI are .BAS for compressed, or binary, loading of BASIC programs; .BIN for mach. lang. storage; and .DAT for data, or ASCII, storage.

CCDOBI appears to provide a fairly comprehensive (as I said, I just received the system, so haven't had time to really get into it - the couple hours of making "backups" and playing with it went smooth as silk, with no problems whatsoever) operating system for a "first release" system. The Commands supported are:

```
MUDISK - Configure a new disk for operation
CAT - Read the Disk Catalogue (Filename, Extension, Size, Type)
BACKUP - Make an identical copy of the Disk
COPY - Copy a single file
RENAME - Change a file name
KILL - Delete a file
MERGE - Join ASCII programs together
VERIFY - Double-check all disk operations
FASL - (on or off) Set trk-to-trk stepping rate (default slow)
```

SAVING and LOADING programs use the normal Color Computer BASIC syntax without the "C" prefix (LOADN instead of CLOADN) with a couple extra thrown in. The first is LOADN! Load a ROM Backup File. This is a special COLOR COMPUTER Command which allows the user to plug a C.C. ROMPACK into Exatron's ROM Backup Adapter" cable (\$19.95), connect it to tape, reconnect the CCI (which will probably be what this THING is called), CLOADN the tape to the Computer, and then SAVEN! ROMPACK/BIN! - it to Disk. A LOADN! ROMPACK/BIN! will then load the program back into the Computer from Disk, "switch off" the CCMDN ROM (allowing the use of the 2K RAM in its place - it can be switched off by the user with a POKE Command, also), and you now have the ROMPACK program running in RAM. The other "special" Load is LOADN! this loads a standard Model I ASCII file from a Model I Disk into the Color Computer - a few syntax changes, redo PEEKs, POKEs, Display Statements, etc., and you have a Model I/Color Computer. The Exatron CCDOBI supports both Random and Sequential File handling operations thru 11 buffers (up to 5 can be used for random access) with the normal OPEN, CLOSE, INPUT, FIELD, etc. type of commands, such as OPEN#0:"B:\WORKTEXT\DAT1" which would Open for Output buffer 00 with the Filename of WORKTEXT, a .DAT type file, using Drive Number 2.

The Exatron CCI/CCDOBI system has several good features. The 32K memory in the CCI is meant to add to the normal 16K that is in the COLOR COMPUTER (if you only have 4K, they offer the chips to go to 16K for only \$12.00), but if you already have 32K on-board, it automatically deselects one bank of it's memory, allowing you to operate with and without the CCI without having to either give up 16K when not using the CCI or install a switch to select or deselect your 16K. The CCMDN gives you a Memory Test for the banks beyond the R.S. Diagnostics Cartridge's range. The 2K memory occupied by CCMDN is normally deselected by the CCI, but you can use this RAM and deselect the CCMDN ROM with a simple POKE Command from BASIC.

CCDOBI lives entirely in the high RAM provided in the CCI. This feature allows you to operate any disk drive as the "default" will be controlled by the ASSIGN Command; once the system is "booted up" from Drive 0 when the Computer is turned on. You can then remove the Disk containing CCDOBI from Drive 0 and install another Disk for normal use, providing more storage space since you don't need a "system" Disk. This system also leaves the full lower 32K memory for BASIC's use; none is taken up by the Disk Operating System. Finally, CCDOBI operates as an extension of BASIC; there is not a separate DOS command level AND a Disk BASIC command level. You must have EXTENDED BASIC in the Color Computer to run CCDOBI, it uses some of the provisions for Disk Operation that was built into Extended Basic.

OK, Exatron's CCI/CCDOBI looks good! Where does it come from here. I think you'll see several things coming along. Double-Density is in the design stage, compatibility with ISC's FLEX and Micrograph OS-9 is in the works, probably Double-Track/Double-Side operation in a while, several major COLOR COMPUTED Software manufacturers are working on Disk Versions for the EXATRON CCI/CCDOBI System. To mention a few of the ROMS I have come across. First on the agenda at EXATRON is to get Version 1.0 enough operational use to see where "bugs" may show up and get them corrected if they occur. They have a CCDOBI Update Service which consists of returning the original CCDOBI Disk to them (after you have made BACKUPS, of course), along with \$19.95, and when a new version is released, they copy it to your disk and return it to you with an updated manual.

The temporary Manual supplied with the unit (regular Manuals will available shortly) was written by Jim Perry and was better than a lot of the Final Manuals I have seen. The material is presented in a logical manner, and leaves very few minor and no major questions unanswered. If you start on page 1 and follow it thru, you have an operating system, with Backups, before getting deep into the syntax and operation of CCDOBI, and you have a good idea of what is happening as you do it. Since you have been using the System and know it works, you are now ready to begin studying the operation of CCDOBI without "skipping through the technical stuff" to get your "pat" working, and probably missing something important in the process. Well done!

REVIEWS:

The MICRO MONITOR
P.O. Box 1110, Del Rio, Co. 78840

CRUG - a Color Computer MONITOR
on Tape: \$29.95 or in ROM: \$39.95

CRUG is a MONITOR Program for the Color Computer. It is available either on tape or in ROM. The ROM version can be installed in the empty EXTENDED BASIC ROM Socket in the computer, if you do not have EXT. BASIC, or in the "DIAGNOSTICS" Cartridge if the EXT. BASIC Socket is not open. It is accompanied with EXEC MONITOR if in the Computer, or with EXEC MONITOR if in the Cart. The Cartridge "IN-OUT" is deactivated when CRUG is installed in the Cart by cutting the Circuit P.C. (and nearest the rear of the Computer on the Diag. Cart. (This is the 4th set of contacts from the rear of the Computer on the connector; the top pin (Pin 8) is shorted to the bottom pin (Pin 7) when a Cartridge is plugged in, tying the Quadrative Clock signal "Q" to the CPU thru PIA 1A which generates an interrupt which EXEC's Watchdog and gives control of the Computer to the inserted Cartridge). This allows the user full control by EXECuting to CRUG and returning to BASIC via the "B" (go back to BASIC) Command from the MONITOR. The ROM installation procedure is discussed in the Owners Manual which is provided with either the Tape or ROM Versions of the Program. The Tape Version normally loads at \$0600, and relocates BASIC's Pointers when EXECuted so that programming in BASIC will not interfere with CRUG. Both Programs are the same, so the Tape Version can be off-set loaded if the user wants (obviously, they are "Relocatable", since the ROM can be moved around), but care should be exercised to prevent conflicts with BASIC. The Owners Manual discusses the "cold" and "warm" start procedures, and also provides a procedure for loading the ROM Program on tape, allowing the use of either version as the situation requires.

CRUG operates with "single key" Commands which are relevant to the desired operation, providing a Command Structure that is very easy to learn and use without having the Owners Manual open right beside you. This also makes it easy to use with multiple programs; there is very little confusion about which Command to use with "this" program and which to use with "that" program. The Commands and their operation are as follows:

G--"Go" back to system control.

R--display "Register" list. This displays the contents in the Registers in HEX (CRUG works strictly in HEX; no preceding symbols are required). A good feature of this Command is that the Condition Code Register is displayed binarily, with a dash indicating a "zero" bit and the LETTER representing that bit for a "one" bit.

C--"Change" register. This is followed by a single letter (A,B,D,X,Y,U,C (Cond Code), O (Dir Page), and P (Prog Counter)) .

M--"Memory" examine and/or change. "M 1234" displays 8 bytes with the cursor by address \$1234. The four "arrow" keys allow full cursor control - up and dn. arrows cause the display of the 8 bytes before or after the displayed line, so scrolling forward or backward is easy - lit. and rt. arrows move the cursor in one-byte jumps in either direction. Entering two hex digits changes the memory's content (ENTER) puts you back in the Command mode while typing another "M" puts you back to the Memory examine/change mode awaiting another hex location entry. Inverted numbers indicate a write to an area without RAM.

I--"insert" hex to memory. This is a "block load" Command which allows clearing a block of memory. Inserting RTS or RSTs, etc. "I 1234 2545 98" inserts zeros in memory from \$1234 to, and including, \$2545.

T--"transfer" a block of memory. Used to move a program to another location, for instance. "T \$000 0020 \$400" would move the Tape Loaded CRUG from its' normal dwelling place to \$0000 thru \$4020 (including the last byte at \$0020). This would, of course, change the EXEC loc. so you would have to specify it to EXEC it.

L--"load" hex. Use this Command to insert data or code thru the entry of hex bytes without the formatting of the "M" Command - "I 1234 23 45 67 89 0A" would insert those bytes into memory beginning with memory location \$1234 and thru \$123B.

J—"Jump" to a each. lang. subroutine. This is a "JBR" Command, and when an "RTB" is encountered, control returns to CBUG.

B—"Baud" rates followed by a VALID baud rate (110, 300, 2400, etc.), also followed by a P or C. The P is used if setting the baud rate for a Printer of something under the control of BASIC, the C is for use with the Com Link (discussed shortly) use.

B—"Save" to cassette. "B 1234 2345 1357 MYFILE <ENTER>" will copy the data from 1234 thru 2345 to the Cassette with the name of "MYFILE" with BASIC's EXEC Pointer set at 1357 when the Tape is loaded with BASIC's LOAD "MYFILE" <ENTER> Command. CBUG does not have a Cassette Load Command; the tapes "Saved" with the "B" Command are loaded from BASIC and are Mach. Language Files.

D—"Convert HEX to DECIMAL." "D 1234" will print out 4660, the decimal equivalent of 1234. A Carriage Return <ENTER> is not required with this Command as all Hex entries are 4 digit.

C—"Convert DECIMAL to HEX." "C 12345 <ENTER>" will print out 3039, the Hex equivalent of the decimal number 12345. Here, the Car. Rtn. is required, as the length of a decimal number is unknown.

I—"Take over Software Interrupt. This should be entered shortly after Executing CBUG, so that when a SWI (63F) is encountered, control returns to the CBUG MONITOR. Until this Command is activated, it is undefined as to what would happen should a SWI be encountered after a "J" Command. This is the normal "Breakpoint Control" used in most Monitors, and allows the insertion of SWI's in programs for debugging when one is encountered. The Registers are displayed and control is returned to CBUG.

P—"move display 'Page'". This one can keep you occupied for weeks. Normally, the 512-byte block of RAM beginning at 64000 is the Screen Display area. This Command allows ANY 512-Byte block to be displayed. You see some wierd displays with this one. Even though you don't see the keyboard entries after you have moved the display page, you have not affected the operation of the Computer; you just can't see what you are doing. A Printer echo would be nice, but a handy notepad and some care around the keyboard save this one of the best "ADVENTURE" games going. Just remember the RESET button, and have at it - you can't hurt anything. It also has a valid place in this Program, for instance, type "P 0000" - the Screen goes crazy - then <ENTER> you are now looking at page zero and will see one spot going crazy - that is the Cursor Counter. Like the Manual says, "if you're daring type B to return to BASIC and carry on while watching the variables" on Page zero Educational, no end. To look at a particular memory byte, for example 1234, type "P 1234" and there will be a spot on the screen going crazy; hit <ENTER> and that spot will display the info in that byte (1234). Impressive!

U—"Upload". The baud rate should first be set (for example, "B 1200 C"). U 1234 2345 will send to the com link (the SERIAL I/O on the Computer) and to the screen the contents of memory locations 1234 thru 2345 in Motorola's checksummed format.

D—"Download". Again, baud rate should have been set. Data is expected at the com link in the same format as the "Upload". Any key entry terminates the loading.

RU—"R/U" mode. This mode is useful for using the Color Computer as an intelligent terminal connected to a host system. The baud rate must have been set, and commands are entered from the com link, not the keyboard. All keypresses are sent to the com link. The only way out of this mode is the RESET button.

X—"Terminal mode. The baud rate must have been set at 110. This Command causes the Color Computer to act like a CRT terminal. There are two forms of the Command: X F and X M for full- and half-duplex modes. Lower-case letters are used as control characters: the <BREAK> key outputs a B for ESCAPE, control-M is the lower-case M, etc. The Control-M is the only way out of this mode. Higher baud rates may be used if the sending device pauses after any character which causes a scroll.

<RESET>—Game old Reset -> back to BASIC.

The CBUG MONITOR Owner's Manual contains 38 pages of information: 4 on the use of CBUG and it's commands, about 4 more discussing the ROM/TAPE Versions, and the installation of the ROM in the DIAGNOSTICS Cartridge, and the rest is a well commented Source Code Listing of the MONITOR. It is complete and will leave few questions in the new Computer Users mind as to how it works and how to get it operating. There is also some good notes on Hi-Resolution Graphics on the Color Computer and a short discussion of Computer Generated Music. The Commented Source Listing will provide much good information for the new Assembly Language Programmers, and many good ideas for those more advanced. All-in-all, it is a good Manual for this type of Program.

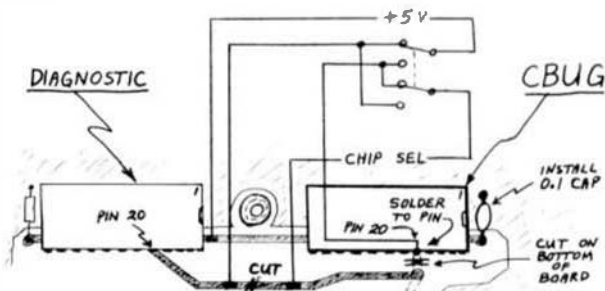
I have been using the ROM version of CBUG for a few months and am very pleased with it. I mounted it in the R. S. DIAGNOSTICS Cartridge (which has an empty slot for another ROM) per Micro Works instructions, with the exception that I installed a small DPDT Slide Switch (available at most R. B. Stores) so that I could switch between the DIAGNOSTICS and CBUG. Pin 26 of the ROM is the Chip Select pin; the ROM is DISABLED when it is HIGH and ENABLED when it is LOW. I cut the PC Land running between Pin 26 of the two ROMs on the top of the PC Board, and the Land between the CBUG ROM Pin 26 and the feedthru on the Bottom of the Board (this land is only about 1/8" long). The easiest place to pick up the +5VDC is from the PC Land on top of the board that runs UNDER the two ROMs next to the Cartridge Case Assembly post. A hole was cut in the back of the Cartridge Case to allow the switch handle to stick thru and the Switch Assembly was applied to the PC Board on its side. See wiring diagram below. Check continuity to make sure you are switching between the two ROMs, with one ENABLED and one DISABLED, then plug it in and fire up the Computer. Feel free to switch between CBUG and DIAGNOSTICS with the Computer ON; you can't hurt anything if the wiring is correct. I always have this Modified Cartridge plugged in when I'm using the Color Computer if I don't have the Blot tied up with another Cartridge.

The MICRO WORKS has a real winner in the CBUG Version of CBUG. My suggestion would be to get the ROM Version of CBUG; it can not be "booted" (wiped out of memory) by a runaway program, it does not take up any of BASIC's memory space, and you can make a Tape Version of it yourself if you ever need to use it with something else in the Cartridge Slot. I would NOT recommend using the "T" Command to transfer it to RAM and then unplug it and insert another Cartridge! That is asking for some blown chips inside the Computer. If you want to look at some of the Bases, or whatever, make a Tape copy and use that.

This Program definitely deserves a TRIPLE A RATING.

BBC Disassembler — A Color Computer SOURCE GENERATOR on Tape — \$49.95 (Requires 16K min. memory, but NOT Ext. BASIC)

The MICRO WORKS BBC Disassembler is a Cassette Tape Program which



is loaded with the BASIC "LOAD" Command. It loads from 64000 thru 64335, residing in a little over 3K of memory. The quality of the recording is excellent; I have never had a problem loading the program. The BBC Program is relocatable, although it is not designed to be moved itself. Provisions are incorporated within the Program to compensate for relocating the program to be disassembled to an area just above the BBC Program. The "target" program is protected and the SOURCE GENERATOR output adjusts for the "offset", providing true label and symbol references as though the "target" program was in its normal location. If the "target" program is out of the way of the RAM between the end of the BBC Program and the normal system stack, or is small enough that the symbol table will not require much room, no "offset" need be specified, and disassembly can proceed normally. This is a two-pass Disassembler; a symbol table is developed during pass one, and then the disassembly listing will begin (it requires about 45 seconds to complete pass one when the entire BASIC ROM is being disassembled, for example). The listing can be sent to a Printer or to the Screen, and is controllable if sent to the Screen. Shift-2 will stop the listing as it does in BASIC; any key restarts it (a seldom-used feature). Hitting the "Space Bar" halts the listing and puts it in the single-step mode each time the Space Bar is hit. Another line is listed. Normal listing is returned by pressing any other key. Pressing the "B" Key switches the listing between fast and slow; each time it is pressed, the listing speed toggles. I normally run a listing using the "Space Bar" and "B" key (the "B" key does not change the speed when coming out of "single step" mode). I also normally change the "slow speed constant" at location 68615 from the established value of 6812C to something like 68200 or 68280 to slow the "slow speed" listing a little more, especially after the first run thru the disassembly procedure. The <BREAK> key stops the disassembly and returns for a restart (but does not destroy the previously entered parameters).

When the BBC Disassembler is EXECUTED, it asks for a series of initialization parameters. These can all be "Defaulted", providing a listing to the Screen of the complete BASIC ROMs in the "default format". (Default by pressing <ENTER>). BBC expects input to be in a 4-digit Hex format (without preceding symbol), or a Y/N for yes or no, followed by a Carriage Return (<ENTER>). Entries can be edited normally (backspace, etc.), and only the last 4 digits entered are used. Since this is a "full blown" Disassembler, there are several area and output format options. These make the operation of the program a little harder than the simpler single-line disassemblers, but it also allows the COMPLETE disassembly of a program.

To quote from the BBC Owners Manual: "A program is generally made up of machine code, data tables, address tables, and so forth, all intermixed at the discretion of whoever wrote the program. Since there is no reason why data can't look like code, it is not possible for any disassembler to automatically figure out the boundaries of these areas. The 'AREA OPTIONS' in this disassembler allow you to specify how to treat each area within the block being disassembled." And again: "Disassembly is normally a two-step process." (At least two, normally several more - RM.) "First, you disassemble the entire block treating everything as code. Certain blocks will stand out as being data, and the ASCII column on the output will help to identify text strings. You note a list of these areas and then enter them to make a new listing which is much 'cleaner'. If a perfect listing is desired, the new listing is studied at length until a complete list of areas is discovered, and the disassembler is run yet again." The "AREA OPTIONS" supported by the BBC are:

P - program area (machine code)
D - data area (FCB, "Form Constant Byte", mnemonic)
A - address area (FDB, "Form Double Byte", mnemonic)
B - text string area (FCC, "Form Constant Code - ASCII", mnemonic)
V - variable area (RFB, "Reserve Memory Byte", mnemonic) — contents of memory are ignored by the disassembler)
T - table area (alternating FDB and FCB)
E - end of last area

When the "START ADDRESS?" is entered, it actually defines this as a P area, so it does not need to be defined in the "AREA OPTIONS" unless the program starts with a different area. Also, the E area spec is seldom used, as this is defined with the "END ADDRESS?" spec. Any "AREA OPTION" specified generates a label during the disassembly, although there will normally be no reference to it in the program. Some tables can not be covered with the T area spec; each division must be specified, generating a large Symbol Table, to get a "clean" listing. The "area spec" utilized by the BBC Disassembler will cover most situations, and provides a flexible program without greatly increasing memory utilization or user complexity.

The following parameters are requested when the program is started:

START ADDRESS? — Beginning of program to be disassembled.
END ADDRESS? — End of the program.

ADDRESS OFFSET? — If the program was moved to make room for the BASIC Program, how far from its normal location was it moved? It is best to locate it just beyond BASIC to preserve memory space for the Symbol Table, etc. Also, the START and END ADDRESSES are the addresses of the program where it normally resides, not where it was moved too.

SYMBOL TABLE START? — This is normally "defaulted"; it is only used if you have offset the target program and don't want the Symbol Table to destroy it. If the program was moved to just above the Disassembler, then start the Symbol Table just beyond the target program.

SYMBOL TABLE END? — Again, normally defaulted. Use this spec if the target program is in "high" memory, so the Symbol Table will be developed between BASIC and the program.

AREA OPTION? — As discussed above, the entry format for this spec is a little different here, a letter (identifying the area type), space, 4-digit number (the hex address (locater) is entered — i.e., 50617<ENTER>) would specify a FCC (string) area beginning at location 50617. This would normally be followed by a P area where the actual code starts again, etc. Areas are specified until all are entered, then <ENTER> for an area spec tells the program you have completed the area entries.

FULL OUTPUT? — This looks for a Yes or No (Y or N) entry; if Y, it skips the next question, if N...

SCAN FORMAT? — Again, Y or N. If No to both output questions, it goes to the Default Format. The Output Formats will be discussed shortly.

TO PRINTER? — Another Y or N answer (again, hitting the <ENTER> key is the same as NO for all of the input parameters). If No, or Defaulted, the program moves on into running Pass One, and the Screen Display remains stationary until Pass 1 is complete and the listing to the Screen begins. If a Printer output is wanted, a Y answer produces

88-COLUMN? — If you have an 88-Column or some printer, answer Y; again, the Screen Display is frozen during Pass 1, and remains so when the Printer starts listing the output. If N is answered for <ENTER> is hit)

NO OR ON BOL 32? — Is asked. When I defaulted this question with a R.S. QUICK PRINTER II I got extra Line Feeds, so had to answer Y. It asks "Do you want the program to NO! put out a Carriage Return at column 32?". Does automatically "CR" at col. 32, some don't. If you have a 32 Column printer, try it both ways to see which works best.

After the listing is complete, the program asks RESTART WHERE?. You have several options open which are discussed in the Owners Manual. Basically, you can "default", which returns to the START ADDRESS, END ADDRESS, etc. routine. If these are "defaulted" also, thru the questions, you will be asked NON-DEFAULT AREAS? when AREA OPTIONS is defaulted. It is a little confusing (BASIC was built in this way so a default, which means "no", could be used), so lets simplify it some. DEFAULT THE FIRST "AREA OPTIONS" AND "NON-DEFAULT AREAS?" QUESTIONS! This will bring up ANY OTHER AREAS?, to which you can answer Y, which will bring up AREA OPTIONS again. NOW, enter any new options. This will keep all previously entered options, and allow you to add to or re-specify them. If you enter a new option the first time the AREA OPTIONS request comes up, after you have run a pass thru the program, all of the previous area specs will be destroyed, including START and END ADDRESSES, SYMBOL TABLE space, etc. Again, if you want to add or change area specs after the program has run thru the first time and you get the RESTART WHERE? question, hit <ENTER> to default and you will get a RESTART!!! followed by the START ADDRESS? question. Just keep defaulting until you get the ANY OTHER AREAS? question! answer this with Y, which brings AREA OPTIONS! back, and THEN enter new area specs. This procedure will keep ALL old area specs, plus add any new ones you want to add. OR, you can just enter a new address, which must be BEFORE the original Start Address that you had entered the previous run, and the program will run keeping the previous information you had input. These procedures allow the use of several passes thru the program to locate different areas in attempting to obtain a "clean" disassembly.

There are 6 different output formats available with the BBC Disassembler. Three of these are selectable during the initial spec input when you are asked if you want FULL OUTPUT?, if not, SCAN OUTPUT?, if not, you start with the DEFAULT OUTPUT. The FULL OUTPUT is written in two lines on the Screen and on a 32-column Printer, or a single line on an 88-column Printer. It is the recommended format if an 88-column Printer is available, and contains the complete output with reference and cross reference addresses, ASCII column, etc. The SCAN OUTPUT will fit on one line on the Screen, and contains complete ASCII and Data columns at the expense of labels and address ref. and info. The DEFAULT OUTPUT also fits on one line on the Screen, but only outputs the first two data bytes (followed by a * to show it is actually more, if needed) and no ASCII col. to make room for labels. The other three output options can be selected during the listing, and are Source Only, Reference, and XReference outputs which are seldom used (The MICRO WORKS SDBASIC Software Development System Ed/Ans/see/Man Manual gives a procedure for changing some of the Code in the BBC Disassembler to make it output Source Only to the Cassette Tape so it can be loaded with SDBASIC, changed, edited, etc., and assembled to a new program). These outputs, with the other three, can be selected during the listing by pressing the following keys on the keyboard: 1=Full 2=Scan 3=Default 4=Source 5=Reference and 6=Cross-reference. Again, the BBC Disassembler provides several options to help in the disassembly of a program.

I normally run a disassembly as follows:

- 1- Change location 50615 as previously mentioned to allow the "slow" listing some more.
- 2- Run the first time thru the program in the Scan Format to the TV Screen, making notes of the ASCII areas and any other areas I can pick up.
- 3- Enter these, repeat if I think I missed some the first time thru.
- 4- Try the Default Format to the Screen to locate sure areas.
- 5- After these passes, I then list a Full Output to the Printer (or before using. This allows a reasonable disassembly to hard-copy before using up a lot of paper and time waiting at the Printer).
- 6- Study, Study, Study, the listing! trying to define all the other areas for a final "clean" listing.

The Manual furnished with the BBC Disassembler is a little weak in the use and operation of the program, but has a LOT of GOOD information on the Color Computers "inside". It will take a lot of use and study to figure out all the ramifications of the program and the output, but a Commented Source Listing is provided (less the large Data Tables, which aren't such help any way) which helps when questions arise. The info on the Computer covers hooking up a Printer, a general memory map, a thorough examination of the P16s and their addresses and control, and a look at the 6883 Registers and Video Graphics Modes. The "Gold Mine" in the Manual is approximately four pages of "interesting addresses" in the BASIC ROM Chips and Page Zero Variables. Also included is the area specs for the Extended Basic ROM to produce a "clean" disassembly of it.

This is an excellent Disassembler, providing the flexibility to obtain a complete disassembly while making efficient use of a small amount of memory. It does have a shortcoming, and a couple weak points. This program was written primarily to disassemble the BASIC ROMs, which put the Direct Page Register at page zero and leave it there! Consequently, it does not pick up any DP manipulations. These operations must be carried thru a program manually. It would be nice to have the Printer Echo the Screen! this would provide a permanent record of the area specs, which sometimes get very long (it's a pain to have to copy these onto the printout to have a permanent record — I somehow manage to lose the note sheet they were on in a few weeks). Also, some pagination capabilities would be helpful (i.e., page headings and numbers, entering the Name of the program, the Date disassembled, etc.). Hopefully, the Disk Versions of this program will include some of these features.

All in all, this is an outstanding program, which we have come to expect from The MICRO WORKS. This is another of those AAA programs, and a fine example of what can be produced for the Color Computer.

SIGN-OFF:

Another month with the COLOR COMPUTER is complete — the usual request: send us a line and let us know what you want to see in this Column. Last minute REQUEST: it looks like EXTENSIONS "finalized" CCOBS will be available around the time you read this column. It will support 35/48/77/88 track, double sided, double density 5.25" Disk Systems! Pricing unknown at this time, but will be competitive with the R.S. Systems "finalized" meaning that the DOS will be stable enough that Software Producers can "link" to it knowing the User Accessible Routines will not change, making their conversions unusable with advancing versions. Next Month we'll look at the MICRO WORKS SDBASIC Software Development System, NELSON's SUPER "COLOR" WRITER, and whatever. Again, let us know what you want to see in the Column. —RUN—

color REVIEWS

UTILITIES: SIGNON AND SECS

I had seen the half page ad in at least a dozen magazine issues, and decided that perhaps "signon did need a little sec", as DataSoft advertised. I bought SIGNON from a local software distributor, and ordered SECS by a/c, which arrived within 10 days. SECS proved to be three programs in one attractively packed cassette, supplied with an instruction booklet and a card requesting user feedback. The first program, Screen Edit and Control System, is a machine language program which has cut my basic programming time literally in half. Basically, it enables the four arrows on the TRB-80C. One can move the cursor up, down, left or right with extreme ease, thus accessing the line to be edited. Pressing "break" at the start of the line enters edit mode. Shift left scrolls the right part of the line towards the cursor and erases material. Shift right scrolls the right part of the line away from the cursor, generating blanks for additional characters. Enter saves the new line. Lines can be combined, deleted, renumbered, and added to with extreme ease. I have made it automatic to load in SECS whenever I program in basic, and I think that there is just no comparison with the extended basic edit command — I just no longer use it!

The two other programs in SECS are a high resolution graphics program and a character generator. To be honest, I have not found much that the Hi Res can do that Extended Basic cannot. It seems that this program (which unlike the edit function needs 16k to run) is useful primarily for people who do not have extended basic. However, there is one aspect of the hi res which I have enjoyed playing with immensely — the character generator. This program allows spaceships to be constructed, overize letters to be drawn, or even

(if one has the talent) chinese characters to be made! These can be flashed on the screen instantaneously, or saved on tape for later use.

Documentation for these programs in a professionally printed 6 page booklet which thoroughly describes how to load the programs, all the commands in them, and any problems one might encounter. All in all, this is a very professional piece of software, with no bugs I could find, supported with excellent documentation and even friendly advice when calling the provided telephone number. I wouldn't be without it for basic programming.

Bigmon by Datasoft is a utility for assembly language programming. It features a monitor, disassembler, and a "mini-assembler." If, like me, you do not know what a mini-assembler is, it assembles all the standard 6809 mnemonics, but without the capability of labels or comments. It is possible to use BIGMON for writing assembly language programs, but it is designed more for debugging in which a few statements need to be changed. As with BECS, I found Bigmon excellently designed and conceptualized. Having never programmed in assembly language with microcomputers, I found that with their excellent documentation (again in a slick booklet style), I was able to immediately dump selected areas of memory, disassemble machine language programs into mnemonics, list character strings in memory, as well as assemble machine language subroutines. BIGMON allows one to set up to nine break points to stop program execution, and a step command to take one through a program a step at a time and display register contents at each step. The program is extremely easy to use, and the instructions are completely clear and complete. At \$29.95 each, these two programs are a bargain, and their professional approach to packaging and documentation is a relief to one who is used to badly xeroxed instruction sheets that leave important questions unanswered.

BIGMON and BECS are available from DATASOFT, 19519 Business Center Drive, Northridge, CA 91324.

Reviewed by Bill Bruck.

TIMETREK by Aardvark

Timetrek was the first STartrek type game I had even advertised for the TRS-80 Color Computer, so I called and ordered one. The program came in 6 days, which is a personal record for prompt software delivery. The program, written in basic, came with a poorly xeroxed printout of the source code, and absolutely NO DIRECTIONS! I had played startrek on other computers a few years ago, and I would have been floundering. The Enterprise control room appears on the screen to begin with. It does not flash on the screen, but is built up over perhaps 3-5 seconds, giving the standard short and long range scanners and status of all systems. The game is exciting as you race from one quadrant of space to another destroying klingons with photon torpedoes and phasers and racing against the clock to win for the federation. Ultimately, however, the program fails, both as extended entertainment and as a professional product. Five times, while playing, I have received an FC error which has dumped the game in mid action, and which has generated dark thoughts of stew made from aardvarks. I still do not know what the battle computer does besides flash up ever changing mysterious numbers whenever klingons are in the vicinity. After two long distance calls to Aardvark, I have talked to two salespeople who know nothing about the program, been promised a callback which I have not received, and had my questions taken down (on battle computers and the like) with the promise of a written answer. What I received was a program listing for a timetrek that I don't own - it must be either an earlier or later version, and in any case wouldn't have answered my questions.

More than this, however, I found that after perhaps 10 games, there was little challenge to timetrek. Klingons don't really destroy you (unless you are critically short of energy); hitting stars doesn't hurt the intrepid Enterprise (after running into a red giant at warp 4 one gets the lackadaisical message - blocked by star); and when the game is over (win or lose) the screen doesn't even clear before printing the terse "you win" or "you lose" - in fact, it doesn't seem to make any difference to the program or to you.

At \$14.95, Timetrek is cheap; however, before it can be a truly exciting game it needs an explanation of commands and general documentation, to have bugs removed, and most probably to be re-written in machine language to overcome a most frustrating tendency for

controls to have lags making it impossible to see what commands have gotten through, and screens to reform without a several second pause. It's a good try, but obviously a first generation effort.

Timetrek from Aardvark, 2352 S. Commerce, Walling Lake, MI 48088

Reviewed by Bill Bruck

DON WILLIAMS SR.
PUBLISHER
'68' MICRO JOURNAL
3018 HAMIL ROAD
MILLS, TENNESSEE 37133

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DON,

A FEW ARTICLES HAVE APPEARED IN YOUR MAGAZINE FOR THE NEW RADIO-SHACK COLOR COMPUTER, SO I THOUGHT I WOULD WRITE AND LET YOU KNOW WHAT I HAVE BEEN DOING WITH IT.

I GOT ONE OF THE VERY FIRST PRODUCTION MODELS BACK IN OCTOBER OF 1980. MY MACHINE IS SERIAL #940, AND I HAVE HAD ABSOLUTELY NO PROBLEMS WITH IT. THE THING THAT MOST IMPRESSED ME WAS THE LOW COST OF A 6809-BASED SYSTEM. I HAVE NOT BEEN DISAPPOINTED.

I USED THE CASSETTE TAPE-RECORDER FOR QUITE AWHILE, WAITING FOR DISKS TO BECOME AVAILABLE. EVEN THOUGH RADIO-SHACK KEPT SAYING "SOON", I DECIDED TO DEVELOPE A DISK SYSTEM MYSELF. OF THE TWO MAJOR DOS SYSTEMS AVAILABLE FOR THE 6809, I DECIDED ON FLEX FROM TECHNICAL SYSTEMS CONSULTANTS, MAINLY DUE TO THE LARGE AMOUNT OF AVAILABLE SOFTWARE.

I FIRST PURCHASED THEIR DOCUMENTATION FOR THE "GENERAL" VERSION OF FLEX, AND WAS QUITE SURPRISED AT THE EXCELLENT EXAMPLES, AND HOW COMPLETE IT WAS. FROM THIS, I DESIGNED THE NECESSARY HARDWARE USING THE WESTERN DIGITAL 1771 CONTROLLER CHIP, ADDING 8K OF RAM FOR FLEX AT \$6000. EXAMPLES IN THE DOCUMENTATION OF DISK AND TERMINAL ROUTINES WERE VERY USEFUL IN GETTING FLEX UP ON THE COLOR COMPUTER.

I HAVE HAD FLEX RUNNING FOR ABOUT 3 MONTHS NOW, WITH ONLY ONE PROBLEM. FOR SOME REASON, THE "COPY" UTILITY WILL NOT WORK CORRECTLY. I HAVE SINCE WRITTEN MY OWN COPY.CMD, THE EDITOR AND ASSEMBLER WORK FINE, AND I HAVE BEEN VERY BUSY WRITING SYSTEM-TYPE COMMANDS SPECIFICALLY FOR THE COLOR COMPUTER, AND EXTENDED BASIC.

MY CURRENT CONFIGURATION IS:

- 1) J2K, PLUS BK ON THE DISK CONTROLLER BOARD.
- 2) RADIO-SHACK MODERN 1.
- 3) EXTENDED BASIC WITH MODIFICATIONS FOR USING DISK.
- 4) EPSON MX-80 PRINTER.
- 5) EXTERNAL FULL-SIZE KEYBOARD.
- 6) MODIFIED VIDEOBOX SOFTWARE FOR ONLINE SYSTEM ACCESS.

I UNDERSTAND THAT EXATRON'S DISK SYSTEM IS BEING ADAPTED FOR USING FLEX, BUT MY DISK SYSTEM INCLUDES NO FLEX, HAS COST LESS THAN \$100. BECAUSE THE COLOR COMPUTER HAS BEEN TARGETED AT A "PRICE-SENSITIVE" MARKET, I AM QUITE HAPPY WITH MY SETUP. RUMOR IS, THOUGH, THAT THE EXATRON SYSTEM WILL BE THE "STANDARD" DISK SYSTEM FOR THE COLOR COMPUTER, POSSIBLY SURPASSING RADIO-SHACK'S SYSTEM.

THE RADIO-SHACK DISK SYSTEM IS NOT A "DOS" AT ALL. IT IS ONLY AN ADDITIONAL SET OF COMMANDS ADDED TO THE BASIC WHICH ALLOW DISK ACCESS. I AM SURE THAT A DECENT EDITOR, AND A 6809 ASSEMBLER WILL BE OFFERED. HOWEVER, THE POWER AND FLEXIBILITY OF A FULL DOS WILL PROBABLY NOT BE AVAILABLE FROM "UNCLE RADIO". ADDITIONALLY, THE EXATRON SYSTEM IS PRICED CLOSE TO RADIO-SHACK. SOME PEOPLE WILL STAY WITH RADIO-SHACK, BUT WILL MISS-OUT ON REALLY KEEPING THE POWER OF THE 6809 IN THE COLOR COMPUTER.

THINGS ARE MOVING FAST NOW ON DISKS, OTHER HARDWARE, AND LOTS OF SOFTWARE. THERE HAS BEEN A SHARE-OUT ON SOME FLAKY PROGRAMS THAT CAME OUT FOR THE MACHINE SEVERAL MONTHS AGO. ONE PROGRAM I CAN HIGHLY RECOMMEND IS "SIGMON" FROM DATASOFT IN CALIFORNIA. IT IS A FULL-FUNCTION MONITOR, WITH SINGLE-STEP, BREAKPOINTS, A DISASSEMBLER, AND A SINGLE-LINE ASSEMBLER. THERE ARE SEVERAL NICE FEATURES, AND IT HAS BEEN VERY USEFUL IN MY INVESTIGATION AND PROGRAMMING EFFORTS.

IF ANYONE IS INTERESTED, THEY CAN SEND ME A SASE, AND I WILL GIVE THEM COPIES OF THE HARDWARE DIAGRAM FOR MY DISK SYSTEM. IT CAN BE BUILT FOR ABOUT \$100, PLUS SOME CONNECTION HARDWARE. THE GENERAL VERSION OF FLEX COSTS \$150. MY DISK-DRIVES WERE PURCHASED USED FOR \$300 FOR 2, SO MY TOTAL INVESTMENT HAS BEEN \$550 FOR A FULL-SCALE DISK SYSTEM ON THE COLOR COMPUTER.

AS MENTIONED IN YOUR AUGUST ISSUE, I WOULD BE INTERESTED IN DOING REVIEWS OF HARDWARE AND SOFTWARE FOR THE COLOR COMPUTER FOR '68' MICRO JOURNAL. TIME IS ALWAYS A PROBLEM, BUT I SHOULD BE ABLE TO GET A RESPONSE BACK TO YOU FAIRLY QUICKLY. MY MAIN INTERESTS ARE IN SYSTEM-TYPE SOFTWARE, AND ANY KIND OF HARDWARE ADDITIONS.

KEEP UP THE GOOD WORK, AND I HOPE TO SEE MORE ARTICLES FOR THE COLOR COMPUTER IN YOUR MAGAZINE. IT USED TO USE THE 5-100 BUSES, BUT HAVE NOW BEEN CONVERTED TO 6809 SYSTEMS, MAINLY DUE TO FINDING YOUR MAGAZINE.

Steve O'Neil

STEVE O'NEAL
8609 EAST 73 TERRACE
KANSAS CITY, MI 48133
(816) 356-2345 (HOME)
(816) 234-2675 (WORK)

Part 1

SIMULATION, GAMES, AND RANDOM VARIABLES

by
T. F. Elbert
University of West Florida
Pensacola, Florida 32504

Many analysis problems involving probabilistic systems defy solution by standard analytical techniques because the resulting mathematics becomes entirely untenable. Often, in such a situation, the solution can be obtained by a process called "simulation", whereby a model of the system under investigation is formulated and implemented on a general purpose digital computer. The key to the simulation approach to analysis is that many system models are relatively simple when viewed from the most basic level of operation. The complexity in analysis results from attempting to determine the cumulative result of cascaded basic operations. As an example, the classical "Gamblers Ruin" problem involves repeated plays of a basic game for which the probability of winning is p . The player begins with a fixed amount of resources I and bets one unit on each game. He has determined that if his resources climb to value K , he will take his fortune and leave. One of two things will then happen. The player will eventually leave with K units, or he will eventually leave after having lost all of his resources. The question is "What probability is associated with each of these two possibilities?"

The basic level of operation here is the play of a single game, and the description of this basic operation is extremely simple: the player wins with probability p and loses with probability $q = (1 - p)$. To extend this to the cumulative effect of many plays and to determine the probabilities of the two terminal events is a much more complex problem. In this particular instance, the problem is amenable to analytic solution by recognizing it as a class of problem called a random walk, and the probability of the player losing all of his resources can be determined to be

$$1 - \frac{1 - ((1-p)/p)^I}{1 - ((1-p)/p)^K} \quad \text{for } p \neq q$$

or

$$1 - (I/K) \quad \text{for } p = q.$$

However, it does not take much complication of the basic operation to render the problem of determining the cumulative probabilities completely untenable. For example, suppose that the player has just learned of a "system" whereby he bets one unit each time he has won the previous game, and if he has lost the previous game he bets twice the amount he lost on that game. This results in his increasing his resources by one each time a game is won. Since he can stop any time he wants, he must come away a winner. The additional complexity of a variable wager renders this problem untenable from a strictly analytical viewpoint. As will be seen however, it can be solved quite readily by simulation.

The basic precept behind the solution of probabilistic problems by simulation techniques is the recognition that the answers to such problems can only be given in terms of probabilistic descriptors such as means, variances, probabilities, etc. That is, in the Gamblers Ruin problem discussed above, it makes no sense to ask: "Will the player stop by amassing K resources or will he stop by losing all of his resources?" It makes no sense because the answer is: "Either of the two possibilities might happen!" What does make sense is to ask about the probability of each of possible outcome. Since the basic definition of the probability of each of these outcomes is the value attained by the relative frequency of occurrence of that outcome as the number of trials grows large, it can be approximated by exercising the model many times and determining the resulting relative frequencies. Note that a single solution to the simulation problem produces practically no information. One can infer no more from a single solution than he could from observing the player begin to play with I units and eventually walk away a winner or a loser. Simulation answers are actually obtained by "performing the experiment" by simulation a large number of times.

There are, in general, two kinds of probabilistic evaluation which must be made during simulation. The first of these involves a decision concerning whether or not a random event, which

occurs with probability p , actually occurs or not. This question is answered by having the computer generate a random number (actually a pseudo-random number as discussed in the sequel) uniformly distributed between 0 and 1. The range of the number, (0-1), is then divided into two parts, one of which occurs with the same probability as the event itself. If the random number falls in the part corresponding to the occurrence of the event, this event is considered to occur. If not, it is considered to not occur. In the Gamblers Ruin problem, the most basic operation is the play of a single game. What must be determined is whether the player wins or loses an individual game. This can be done by having the computer generate a random number uniformly distributed between 0 and 1. If this number is less than p , then he wins the individual game. If the number is greater than p , then he loses the individual game. Since values less than p occur with probability p , the play of the individual game is effectively simulated.

The second kind of probabilistic evaluation required in simulation is the generation of a random variable with a prescribed probability distribution, such as Gaussian, Poisson, exponential, etc. It will be shown later that variables with these distributions can be obtained by transformations upon uniformly distributed random variables. Thus, the basic requirement for simulation of random systems is the ability to generate uniformly distributed random variables. Some compilers have this capability incorporated into the compiler software itself. Others require the user to formulate his own random numbers. In either case one should be aware of the potential dangers inherent in the use of an improperly designed random number generator. Any departure from a uniform distribution, or any statistical dependency of one selection upon another, will produce erroneous results in the determination of the cumulative probabilities.

Most random number generators in use today are versions of the "linear congruential sequence" for generating random integers (Reference 1). Such a sequence is recursively formed from an initial value X_0 by the relation

$$X_{n+1} = (AX_n + C) \text{ mod } M.$$

Thus, each integer in the sequence is determined by a modular transformation on the previous integer. A sequence of integers generated by the above expression is certainly not random, since the entire sequence can be predicted once the value of X_0 is known. However, if the generation of these integers occurs in a manner such that there is no statistical relationship between one number and its predecessor, the non-random character is not undesirable. So long as the user has not made the actual calculation, the next integer in the sequence is, for all practical purposes, random. To distinguish integers like this from actual random integers, they are termed "pseudo-random integers." Unless required for clarity, the term "pseudo-random" will not be used in the sequel. The term "random number" is usually used to specify a random variable uniformly distributed between 0 and 1. To generate a sequence of random numbers from a sequence of random integers, it is necessary to divide by the largest possible integer, which is $M-1$. Thus, the transformation

$$RN = X/(M-1)$$

where X is a sequence of random integers modulo M generates a sequence of random numbers.

It is a property of the linear congruential sequence that there is ultimately a cycle of numbers which is repeated endlessly. This is certainly not a desirable property for a random number generator, but it is possible by prudent choices of the parameters A and C to produce repetition periods of great length so that, for all practical purposes, the sequence appears to be aperiodic. Just how to make such prudent choices will be discussed shortly, but at this point in the presentation some of the pitfalls of random number generation will be exemplified.

In Listing 1 is shown a PASCAL program for implementing the linear congruential sequence for integers less than 180. This is presented for illustrative purposes only, and the limits imposed maintain the integer arithmetic within the 16-bit integer capability of most small computers. To illustrate the periodicity of the generator, the reader might want to try

$M = 128; A = 3; C = 0; X_0 = 100.$

There are 128 possible values that can be produced, but the sequence quickly gets trapped in a loop with period 7. That is, the sequence produced is

44, 4, 12, 36, 108, 68, 76, 100, 44,
4, 12, ...

On the other hand, the parameters

$M = 127; A = 3; C = 0,$

yield a sequence of periodicity 126, one less than the maximum possible. (The reader should satisfy himself that zero is not a possible value in this instance.)

The fact that some sequences have maximum period while others have much smaller periods is no accident. There are well defined rules for selecting parameters so that the maximum possible period is obtained. Before these rules can be examined, however, some basic number theory must be reviewed.

A prime number is an integer divisible only by 1 and itself. The progression of prime numbers is:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29,
31, 37, 41, 43, 47, 53, 59, 61, 67,
71, 73, 79, 83, 89, 97, 101, 103,
107, 109, 113, 127, 131, 137, 139,
149, 151, 157, 163, 167, 173, 179,
181, ...

It is a characteristic of integers that they have a unique factorization into prime numbers. That is, any integer N can be expressed as a product of prime numbers

$$N = (p_1^{e_1})(p_2^{e_2}) \dots (p_K^{e_K})$$

where the p_k are prime factors and e_k is the integer power to which p_k is raised in the factorization. For example, if $N=32676$, the factors are

$$32676 = (7)(31)(151).$$

For $N=262143$, the factors are

$$262143 = (3^3)(7)(19)(73).$$

Here, $p_1 = 3$ and $e_1=3$.

Two integers A and B are said to be relatively prime if there is no integer other than 1 which evenly divides them both. The largest number which will divide both a and b is called the "greatest common denominator of A and B ," and is symbolized by $\gcd(A,B)$. Thus if

$$\gcd(A,B) = 1$$

then the integers A and B are relatively prime. A PASCAL program for determining $\gcd(A,B)$ for the limited range of integers under consideration here is given in Listing 2. It is an implementation of Euclid's Algorithm for finding the greatest common denominator.

With these details now out of the way, the condition for obtaining the maximum period in a linear congruential sequence can be stated (Reference 1).

- A1) C must be relatively prime to M ;
- A2) $(A-1)$ must be a multiple of every prime factor of M ;
- A3) if M is a multiple of 4, then $(A-1)$ must also be a multiple of 4.

These conditions are sometimes difficult to obtain in practice, since choices of M are usually made on the basis of computer word length so that the inherent modularity of integer arithmetic operations by a computer can be exploited.

Condition (A1) can be met by choosing either M or C as a prime number. Or, it can be tested by use of Euclid's algorithm to determine if $\gcd(C,M) = 1$. Condition (A2) is a fairly stringent requirement, since it effectively limits the value of A to the undesirable value of one unless M has repeated prime factors. On the other hand, when $M=2^e$ is chosen as the modulus the only requirement on A is that it be odd. Condition (A3) is fairly straightforward and further restricts the value of A , when M is a power of 2, to those odd integers of the form

$$A = 4q + 1$$

where q is a non-zero integer.

To be continued...

EPSON MX-100

John Tucker
P.O. Box 2898
Laredo, Texas 78041

The necessity of writing this review places me in a terrifying position. Reviewing the correspondence on my desk, I find letters from all over the United States, from Europe, and from Latin America, saying "Your review of the Epson MX-80 did more to influence my buying than their advertising". (That is a literal quote.) That is scary! And it says a lot about what Don Williams will allow to be published in the pages of the 68 Micro Journal. If we read it here, we can believe it.

You will remember that the review of the MX-80 was a "Gee Whiz" review. (See February 81 Issue; 68 Micro Journal.) The machine deserved what was written. The machine left me wondering what Epson could do for the second show. They had the answer — the MX-80 F/T which could handle not only tractor feed forms but cut sheets as well. So what possibly would be the encore? Well, there came along the MX-70 with fewer wires in the print head (so, no descenders on the MX-70 but true descenders on the MX-80), but individual print wire control on the MX-70 for bit dot graphics.

Fine. Both hobby and commercial users at last had a series of small printers that would turn out excellent work, require practically no maintenance, and worked even with poorly perforated or folded forms. In the (apparently unlikely) event of print-head trouble, simply unplug the print-head and plug in a new one. No tools other than your fingers. Not even a screwdriver. Cost? In the thirty-dollar range! Ribbon changes are a snap. They're easy (and clean to handle) cartridge jobs that just drop into place. No dirty fingers — you never need to touch the ribbon itself.

So what is this review all about? It's about the Epson MX-100 — the 15.5 inch Big Boy of the Epson line. Tractor feed fanfold OR cut sheet OR roll paper can all be handled by the machine. It accepts fanfolded forms from 4 inches in width up to 15.5 inches in width. Alternatively, one may use cut sheets (single pages) ranging from 8.5 inches to 12 inches in width. (This allows printing the "long way" on standard letter size paper for presentation of forms that aren't comfortable in the usual vertical format.) As with the MX-80, a simple but highly effective paper separator keeps the ejected forms from having to travel over the incoming paper. Roll paper is also accommodated. And if you wish, simply snap out the tractor feed unit while you are using single sheets or rolls. Snap out — snap in.

Fantastic print-outs can be accommodated on the 15.5 inch width paper. As a quick test of the machine, we set up a simple loop in Basic to determine the usable number of columns. We kept lengthening the loop until we were amazed at what we were seeing — in the condensed printing mode, one of around a dozen modes of printing, we were running over 250 columns on the paper. Well over 130 columns were available in the "normal" size character mode.

It is hard to imagine, but the machine is even quieter than the MX-80. This is, in part, due to the presence of the rubber platen instead of the metal bar against which the small machine operates. Also, the cover is of an improved acoustical design.

The machine weighs a mere 21 pounds (9.5 kilograms). It is roughly 22 inches wide, 12 inches deep,

and 5 inches high — perhaps fractions of an inch over those dimensions. It draws about 100 watts when running.

Mean time between failures is rated at around five million lines! The ribbon life is rated at about three million characters. (Nice ribbon with pleasant black print color.)

With the parallel interface we have, we get the expected 80 characters per second printing speed. Line feed time is around 200 milliseconds. The machine has form feed and it keeps up with the form length in its internal electronics. A form feed character (Hex 0C) accurately pages to the next form.

Printing is in the usual Epson highly readable 9x9 dot matrix with true descenders and a full 95 character ASCII character set PLUS eight — count 'em — eight, international character sets: U.S.A., France, Germany, England, Denmark, Sweden, Italy, and Spain. Some of these were available on the MX-80 via hardware switches and are so selectable on the MX-100 but ALSO these are selectable under software control on the MX-100! This is very valuable to us since we do a lot of correspondence and business work with the Latin American countries.

The Epson MX-100 has other tricks up its sleeve. Individual print-wire control is available in both single density and double density modes for some of the fanciest graphics we've yet seen. In the graphics mode, each of eight print wires is assigned to one of the bits of eight bits of data. If the bit is a 1, the pin fires, if a 0 it does not. If you can create a pattern to be printed, it appears that the MX-100 could print it. We have not had the printer long enough to do much more than verify that this system works and works well. The days of pre-defined block graphics have disappeared.

The manual we received is a very, very preliminary copy containing many reproductions of changes and deletions, handwritten sections, and illustrations that are not of the MX-100 but are applicable. It is obvious that our printer manual is a pre-release copy. Epson is working hard to make this one of the most readable manuals available today.

Interfacing is a snap. Our machine was ordered for a parallel interface (MP-L on Port 7 of our SWTPCo 6800 beauty). When we received our MX-80, not that long ago, we simply unplugged the cable from our old Centronix and plugged it into the MX-80. When the MX-100 came in, we unplugged from the MX-80 and plugged into the MX-100. If you need to build a cable, the plug is the common one used with the Centronix and widely available. There is a very complete list, in very readable form, of all of the signals available on the plug. Of all the signals available, you only need to use the eight data lines, the negative Strobe (In) and the negative Acknowledge (out) plus a ground. We strongly suggest the use of the parallel interfacing system, but if you cannot do it for any reason, two serial interfaces at either RS-232C level or 20 ma current loops are available, one of them having a 2K buffer memory on board. (Note: bit image data is invalid through the serial board without a buffer.) Also available (although this part might get edited out) are interfaces for the TRS-80 (tm Tandy Corp.) with or without the expansion interface; an Apple interface; and an IEEE 488 interface. I suppose the latter would fit the Pet and other Commodore products. A local hobbyist (a masochist, I believe) has interfaced the MX-80 to an Ohio Scientific unit so the MX-100 would also work there. (I will now wash my fingers with soap for having typed those names.)

CONCLUSION: Epson has earned its huge share of the international printer market, claiming now to about 30 percent of the world market. They have earned this

niche by providing very reliable printers and at very affordable prices. The MX-100 will prove to be highly valuable to the 68xx user who needs wider print-outs than provided by the smaller models. It is earnestly recommended to your attention by our giving it the same rating we give the MX-80 — a rating of AAA.

We will now proceed to give it our usual test of running twelve hundred consecutive pages of dense text printing. Past history with other Epson printers tells us we can start and walk away. By the way, nothing is perfect. Our machine is equipped with a beautiful smoke colored dust cover over the printing mechanism. We hope that future production runs will be made with a crystal clear cover to ease viewing the "outbound" printouts. Epson, please note.

PS (or something). This review was "recalled" after being submitted in order to add the following: the MX-100 adds several features in the page formatting area. The MX-80 would allow going to eight lines per inch but overlooked the fact that page length should be reset to 88 lines per inch for "standard forms" when this is done. A maximum of 66 lines could be specified in that machine, but in the MX-100, up to 126 lines can be specified. Therefore, condensed printing at eight lines per inch and 88 lines per page can be specified by software control.

Very importantly, the MX-100 is extremely intelligent. Just as Flex (tm Technical Systems Consultants, bless their souls) has the TTYSET parameters of DP (form depth) and EJ (lines to eject), so has the MX-100 by Epson. One can now have Basic programs skipping over the perforations in fan-fold paper, leaving nice top and bottom margins, and not have to be a machine language expert to write new printing routines. To skip over six lines, simply send ESCape,N,6 (remembering that the six is actually a hex number, so watch it if you want to skip 10 lines or so). Using the HECHO utility, send P,HECHO,1B,4E,6 — substitute any hex number you wish for the number of lines to be skipped over at the perforations.

There is no possible way to adequately review this fine piece of machinery in a reasonable amount of space. I strongly suggest you see it at your Epson dealer. We are deeply indebted to Southern Micro Distributors, 4545 Fuller Drive, Suite 225, Irving, Texas, 75062, for the opportunity to use and review an outstanding printer.

DP client Acct

DP SYSTEM CLIENT ACCOUNTING

The client accounting system offered by D P Systems was designed for C,P,A. firms, Public Accountants and Bookkeeping services. However, it is also a very good package for those organizations that have departmental or cost center general accounting requirements.

The primary intent is for this package to be sold to the above mentioned accounting firms who in turn are maintaining the general ledger and payroll records of their respective clients. The package is suitable for firms with as few as twenty clients or as many as several hundred.

Some of the features of the system are as follows:

A. Multiple clients on a single disk:

The system utilizes 8" diskettes where the program disk resides in drive D and a client disk resides in drive I. The client disk can have several clients and the Main Menu has a selection to change client number. The number of clients is dependent upon the size that you specify when setting up a new client. However, you can easily have ten clients on a single disk. This cuts down on the number of diskettes required (which is important to the Accountants), and since the screen programs display the client number and name there is never any question as to which client you are working with.

B. Custom Formatting:

If you desire, each client can have custom designed financial statements. Most Accountants will develop a standard for Partnerships, corporations, corporations with departmental requirements, etc. and then duplicate these for most of their clients. Of course, you can add to and delete from these standard forms.

C. Departmental and Consolidated Capabilities:

You have the ability to produce departmental profit and loss statements, as well as consolidated profit and loss statements. For example, ABC Tire Company has locations in Chattanooga, Knoxville, and Nashville. At month end you can produce a profit and loss statement for each location as well as a consolidated statement for all locations. You will not find an easier software system to operate on any computer system that we have seen. For example, to get the individual statements you simply enter the location number. Incidentally you can have up to ninety nine departments or cost centers.

D. Combined General Ledger & Payroll System:

Most of the time spent by an Accountant doing write-up work is spent in recording the checks, the cash disbursements entry. With one entry of the check, all postings are made to the General Ledger, as well as to the individual employee payroll record, in the case of a payroll check. The cash disbursement program is written in such a way as to allow entry of checks quickly and easily and permits correction of any errors. All of the payroll reports monthly, quarterly, and yearly W2's are then produced automatically.

E. Audit Trail:

Anyone who is dealing with Business Systems has heard this term. All of the reports are designed as Accounting reports and not as computer reports. The audit trail is very good.

A brief description of the individual programs is as follows:

- A. FILE MAINTENANCE - This program is used to initially set up the chart of accounts, and to add or delete accounts from existing clients. Making changes to an existing chart of accounts is accomplished in minutes.
- B. CLIENT ADDITION & DELETION - This program provides for fast, easy duplication of an existing chart of accounts for a new client. Provision is also made to delete a client.
- C. CHANGE CLIENT NUMBER - Multiple clients can be stored on a single diskette and this program allows you to select which client to work with.
- D. CASH JOURNALS - This program provides for easy, fast, accurate entry of your clients checks, including payroll checks. The checks are entered in the same sequence as the client's check book. A single check can be distributed to multiple general ledger accounts including discounts earned. With one entry of a payroll check the general ledger accounts are updated as well as the individual employee earnings records. A cash disbursements journal and a payroll journal are printed after all checks have been entered.
- E. DIRECT POSTING - This program provides for double entry posting with .00 proof of each entry. This program is most often used for posting such things as bank service charges, depreciation, accruals, etc.
- F. SUMMARY OF POSTINGS - This program provides a complete general ledger report. All detail and summary entries for the month are shown.
- G. TRIAL BALANCE - This report shows the balance for each account for this month and year-to-date. Respective totals are shown as well as total sales and profit or loss for the current month and year-to-date.
- H. INCOME STATEMENT - The income statement shows monthly and year-to-date dollar amounts as well as corresponding percentages. All percentages represent a percentage of sales.
- I. BALANCE SHEET - This report is produced to your specifications. The profit or loss is automatically transferred to the proper equity account.
- J. PAYROLL SYSTEM - This rather the fact: payroll system gives you a great deal of flexibility. Each client has a payroll master which contains information like federal and state ID numbers, general ledger account numbers for gross pay as well as all taxes and other deductions. Six deductions in addition to tax deductions are provided for. When you enter a payroll check in the cash disbursements program, the system asks only for the pertinent data for this particular client. For example, a client may have two classifications of gross pay (officers and employees), federal withholding, FICA, Georgia withholding, insurance, uniforms, and employee receivables. Only this information will be asked for when entering a payroll check. Quarter-to-date and year-to-date figures are maintained for gross pay, taxes, other deductions, and also tips, if applicable. A payroll summary report is provided which shows all pertinent data concerning each individual employee and appropriate totals.

Quarterly reports are generated automatically.

Yearly W-2's are generated automatically.

Adding, deleting, or making changes to the employee earnings record is fast and quite easy.

This system is well designed and well documented. If you would like a closer look, DP Systems offers a demo kit which contains demo diskettes, operators manual and a full set of sample reports. The source programs are available under a license agreement which calls for a one time payment plus a royalty fee for each additional installation of the package.

For further information contact DP Systems at P.O. Box 567 Collegedale, TN, 37315, Phone 615/870-3514.

MINIFLEX director.asm

DIIRECTOR.ASM

D.F.W. MILLIGAN
1325 WYBROOK PLACE
BURNABY, B.C. CANADA V5A 3Y1

WITH AN INVENTORY OF OVER 30 FLOPPY DISKS, RECORDED ON 2 SIDES, IT BECAME EVIDENT THAT SOME KIND OF 'CROSS-REFERENCE DIRECTORY' WAS NEEDED TO KEEP TRACK OF THE SOME 1300 DIRECTORY ENTRIES.

I WANTED A PROGRAM THAT WOULD BUILD SUCH A CROSS-REFERENCE FILE WITH THE MINIMUM OF TYPING. ALSO, I WANTED TO LEARN SOME MORE ABOUT MINI-FLEX (C) DISK INPUT/OUTPUT IN THE PROCESS. HENCE I STARTED WRITING A PROGRAM TO DO THE WORK FOR ME. DIRECTOR.ASM WAS THE OUTCOME OF SEVERAL MONTHS OF STUDY AND PROGRAMMING. I WOULD HAVE LIKED TO ENTER THE 'SOFTWARE' CONTEST WITH THIS PROGRAM, BUT FELT IT WOULD BE BETTER TO THOROUGHLY TEST IT FIRST.

WHEN YOU READ THE SOURCE CODE, YOU WILL FIND THAT IT IS FAIRLY WELL 'SELF-DOCUMENTING' - SINCE IT IS LOADED WITH COMMENTS. IN MANY PLACES YOU WILL FIND LABELS THAT ARE NOT REFERENCED, BUT ARE USED TO CLARIFY THE MEMORY LOCATIONS (PARTICULARLY IN THE FCB'S (FILE CONTROL BLOCKS)).

TO CUT DOWN CONFUSION I HAVE ADOPTED SOME STANDARD FILE NAME EXTENSIONS ON MY SYSTEM. (EVEN USING SOME EXTENSION NAMES FOR FUTURE USE).

.ASM - TEXT FILE FOR ASSEMBLER
.BIN - BINARY FILE
.BAS - BASIC FILE
.TXT - TEXT FILE
.INS - TEXT FILE OF INSTRUCTIONS
.PAS - PASCAL TEXT FILE
.CMD - COMMAND FILE
.SYS - SYSTEM FILE
.BAK - BACK-UP FILE
.SCR - SCRATCH FILE
.DAT - DATA FILE
.BAC -
.DIR - DIRECTORY FILE
.PRT -
.OUT - OUTPUT FILE

FOR THOSE WHO DO NOT WANT TO BE BOTHERED TYPING IN THE CODE, I WILL BE GLAD TO COPY THE SOURCE CODE, AND OBJECT CODE TO A (SUPPLIED DISK) FOR \$3.00 (TO COVER THE COST OF POSTAGE AND HANDLING).

TO ASSEMBLE THE SOURCE CODE TYPE ASMB.DIRECTOR.ASM THEN RENAME THE BINARY FILE TO .CMD.

TO RUN THE PROGRAM JUST COPY IT TO A BLANK DISK, INSERT THE DISK IN DRIVE ZERO AND TYPE 'DIRECTOR'. THE PROGRAM IS SELF-PROMPTING.

THE SOURCE CODE TAKES UP 163 SECTORS AND THE BINARY FILE 9 SECTORS. LARGE CROSS REFERENCE DIRECTORIES (1300 ENTRIES) WILL TAKE 3 TO 5 MINUTES TO UP-DATE, IF YOU WANT TO ADD TO THEM. THE REASON FOR THIS IS THAT THE OLD CROSS-REFERENCE DIRECTORY IS RENAMED TO .BAK AND THE NEW FILE COPIED UNTIL ITS END IS FOUND; BEFORE ADDING NEW DIRECTORY ITEMS.

1
2
3
4
5
6
7
8
9
10
11
12

```
MAP DIRECTOR.ASM (VER 25)
OPT
PAG
*****
*   VERSION 25
*****
```

```
*****
*   COMPUTER - 801PC 8000
*   HARDWARE - HF-80 (DUAL 8010)
*   - 810 12K RAM
*   SOFTWARE - 4101-FLEX (C)
*****
```

14
15
16
17
18
19
20
21
22
23
24
25
26
27

```
*****
*   AUTHED: DENNIS F.W. MILLIGAN
*   1325 WYBROOK PLACE
*   BURNABY, B.C.
*   Canada
*   V5A 3Y1
*
*   COPY OF 1) SOURCE CODE (ON DISK)
*   2) OBJECT CODE (ON DISK)
*
*   MAY BE OBTAINED BY SENDING $3.00 TO
*   THE AUTHOR, TOGETHER WITH THE BLANK
*   4101-FLOPPY THAT YOU WOULD LIKE THE
*   PROGRAM COPIED TO.
*****
```

29
30
31
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33

```
*****
*   SAVED ON DISK-170
*   BACK-UP ON DISK-350
*   COMPLETED WRITING FEB 16, 1981
*****
```

35
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46
47

```
*****
*   A MINI-FLEX PROGRAM TO CREATE A MASTER
*   TEXT FILE (ON DRIVE 0) OF ALL DIRECTORY
*   FILE NAMES
*   (FROM A DISK LOCATED IN DRIVE 1).
*
*   THE PURPOSE IS TO BUILD A MASTER
*   CROSS-REFERENCE DIRECTORY THAT COULD
*   BE:
*   1) MANIPULATED WITH A BASIC PROGRAM.
*   2) SORTED WITH A SORT/MERGE PACKAGE.
*   3) REACHED WITH AN EDITOR.
*****
```

48
49
50
51
52
53
54
55
56
57
58
59
60

```
*****
*   DIRECTOR.CMD SHOULD BE COPIED TO A DISK
*   THAT WILL BE USED TO HOLD THE CROSS-
*   REFERENCE MASTER DIRECTORY. THIS DISK
*   SHOULD THEN BE LOADED IN DRIVE 0 (ZERO).
*
*   TO RUN: TYPE
*
*   DIRECTOR
*****
```

62
63
64
65
66
67
68
69
70
71
72

```
*****
*
*   THE PROGRAM WILL COPY THE CONTENTS OF
*   DIRECTORY IN DRIVE 1 TO THE MASTER
*   DIRECTORY IN DRIVE 0.
*
*   WHEN NO MORE DIRECTORIES ARE TO BE
*   ADDED, THE PROGRAM WILL WRITE
*   AN ASTERISK TO THE END OF THE MASTER
*   DIRECTORY, TO MARK END-OF-FILE.
*****
```

74
75
76
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78
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80
81
82
83
84
85
86
87
88
89
90
91
92
93

```
*****
*   MINI-FLEX ROUTINE
*   EQUATES
*
*   (FLEX IS A REG. TRADE MARK OF T.E.C.)
*****
MAPS EQU 87103
***** FOLLOWING 4 POINTS ONLY (TYPE) *****
GETCHR EQU 8710F :GET CHARACTER FROM KBD
INBUFF EQU 87115 :INPUT TO LINE BUFFER
PTRNG EQU 87118 :PRINT CR/LF AND STRING
*****
PCDLP EQU 8711E :PRINT CD AND LF
NOTCH EQU 87121 :GET NEXT CHARACTER
* FROM LINE BUFFER AND PLACE IN 'A' REG
GETFIL EQU 87127 :GET FILE SPECIFICATION
GETEXT EQU 8712D :SET FILE EXTENSION
OPTERR EQU 8713C :REPORT ERROR CODE IN FCB
*****
```

95
96
97
98
99
100

```
*****
*   FILE MANAGEMENT SYSTEM CALLS
*****
INCLD EQU 87003 :CALL #0B TO CLOSE OPEN FILES
FMS EQU 87006 :FMS CALL
*****
```

102 0100
103 0100 20 01
104 0102 10

```
ORG 80100
START EQU START
VM FCB 25 :VERSION number
```

106
107
108
109
110
111
112

```
START NOP
*
*   SEND MESSAGE TO OPERATOR
*   DESCRIBING PROGRAM
*
LDR 00000
JBR PTRNG :PRINT MESSAGE
```

```

114      * ABA OPERATOR TO CHECK THAT DISK
115      * ARE MOUNTED PROPERLY.
116      LDX #0001
117      JSR PSTNG
118
119      * GET THE REPLY
120      JSR GETCHR
121      CMP A #95F :LOWER CASE ?
122      BLS SKIP2
123      * FALL THROUGH IF LOWER CASE
124      SUB A #920 :REMOVE LOWER CASE DIFFERENCE
125      CMP A #Y :IS IT A YES ?
126      BEQ STAB1 :IT WAS A YES
127      JMP FIN1 :IT WAS NOT A 'Y'

```

```

128      START1 NOP
129
130      LDX #0002 :ASK OPERATOR TO ENTER FILE NAME
131      JSR PSTNG :PRINT IT
132      JSR INBUFF :GET FILE NAME

```

```

133      LDX #00FCB :POINT TO FCB
134      JSR GETFIL :GET FILE SPECS FROM LINE BUFFER
135      BEQ NOERR1 :NO ERROR IF CARRY BIT IS CLEAR
136      JMP INCOR1 :REPORT INCORRECT FILE SPEC

```

```

140      NOERR1 NOP
141      * DROP THROUGH WHEN NO FILE SPEC ERRORS
142      * SET DRIVE NUMBER FOR ZERO '0'
143      LDX #00FCB :READ FCB
144      LDA A #000 :SET DRIVE '0' ZERO
145      STA A 3,X :NEAR LOC'N FOR DRIVE NUMBER

```

```

148      * SET DEFAULT EXTENSION TO .TXT IF
149      * NOT ALREADY SPECIFIED.

```

```

151      * NOTE: SETEXT WILL NOT CHANGE THE EXTENSION IF
152      * IT WAS SPECIFIED BY THE OPERATOR.

```

```

154      LDX #00FCB :POINT TO FILE CONTROL BLOCK
155      LDA A #001 :1 TO EXTENSION NO. FOR .TXT
156      JSR SETEXT :SET IT

```

```

158      * COPY 1) DRIVE NUMBER
159      * 2) FILE NAME
160      * 3) EXTENSION
161
162      * TO WRITE IN PREPARED TION FOR #NAME AND
163      * .BAK EXTENSION.
164

```

```

166      LDX #00FCB+3
167      LDA B #12 :COUNT 12
168      LDA A 0,X :GET CHARACTER
169      STA A 15,X :MOVE CHAR TO WRITE
170      INX :BUMP POINTER TO NEXT CHAR
171      DEC B :DECREMENT COUNTER
172      * KEEP LOOPING UNTIL COUNTER REACHES ZERO.
173      BNE LOOP0
174      * COPY COMPLETE

```

```

176      *-----*
177      * FUNCTIONS *
178      *-----*
179      * 01 - OPEN FOR READ *
180      * 02 - OPEN FOR WRITE *
181      * 03 - CLOSE *
182      * 04 - REMIND *
183      * 05 - OPEN DIRECTORY *
184      * 06 - GET INFORMATION FROM DIRECTORY *
185      * 07 - DELETE FILE *
186      * 08 - RENAME FILE *
187
188      *-----*
189      * NOTE: FUNCTION 00 = READ/WRITE *
190      * THIS FUNCTION IS AUTOMATIC WHEN *
191      * THE JUMP TO FMS IS CALLED. *
192
193      *-----*

```

```

197      * TRY TO OPEN MASTER (00FCB) FOR 'READ'
198      * VIA CALL TO FILE MANAGEMENT SYSTEM (FMS) CALL.

```

```

200      * THIS WILL TELL US IF THE FILE ALREADY
201      * EXISTS.
202

```

```

203      LDX #00FCB :FUNCTION 1 = OPEN FOR READ
204      LDA A #001 :STORE IT IN FCB
205      STA A 0,X
206      JSR FMS :JUMP TO FMS TO PERFORM 'OPEN'
207      BEQ EXISTS :YES IT EXISTS AND OPENED OK

```

```

209      * FALL THROUGH IF FILE DOES NOT EXIST OR
210      * THERE WAS SOME OTHER ERROR.

```

```

212      *-----*
213      * E R R O R C O D E S *
214      *-----*
215      * 01 - ILLEGAL FCB *
216      * 02 - FILE BUSY *
217      * 03 - FILE EXISTS *
218      * 04 - NO SUCH FILE *
219      * 05 - END OF FILE *
220      *-----*

```

```

222      LDX #00FCB :POINT TO FCB
223      LDA A 1,X :ERROR STATUS BYTE OF FCB
224      CMP A #004 :FILE DOES NOT EXIST ERROR
225      BEQ NOFIL1
226      JMP ERROR :SOME OTHER FATAL ERROR

```

```

228      * FILE DOES NOT EXIST - START A NEW ONE.
229      * OPEN WRITE FOR 'WRITE'
230      LDX #00FCB
231      LDA A #002 :CODE FOR 'WRITE'
232      STA A 0,X :STORE IN FCB
233      JSR FMS :CALL FMS TO PERFORM THE OPEN
234      BEQ NOFIL1 :A CLEAN OPEN
235      JMP ERROR :SOME OTHER FATAL ERROR

```

```

238      * FILE WAS OPENED BY THE 'READ' - SO CLOSE IT.

```

```

240      LDX #00FCB
241      LDA A #004 :CODE FOR CLOSE
242      JSR FMS :CALL FMS TO PERFORM THE CLOSE
243      BEQ RENAME :GO AND RENAME 00FCB TO '.BAK'
244      JMP ERROR :SOME OTHER FATAL ERROR

```

```

248      * RENAME OLD FILE '.BAK'
249

```

```

251      * START BY BUILDING THE NEW NAME IN
252      * THE SCRATCH BYTES OF THE FCB

```

```

251      RENAME LDX #FINAME :OLD FILE NAME IN FCB
252      LDA B #11 :COUNTER
253      ANDH LDX A #0 :GET CHARACTER
254      STA A 49,X :MOVE IT TO SCRATCH
255      INX :BUMP TO NEXT
256      DEC B :DECREMENT COUNTER
257      BNE ANOTH1 :LOOP THROUGH WHEN 11 CHARACTERS TRANS

```

```

258      * NOW SET THE EXTENSION TO '.BAK'

```

```

261      LDX #00FCB+40 :POINT TO EXTENSION
262      CLP 12,X :CLEAR EXTENSION
263      LDA A #005 :CODE FOR '.BAK' EXTENSION
264      JSR SETEXT :SET EXTENSION TO .BAK

```

```

266      * FILE NAME AND EXTENSION ARE
267      * NOW SET UP IN SCRATCH AREA OF FCB.

```

```

269      * DO THE RENAME
270      LDX #00FCB
271      LDA A #000 :FUNCTION CODE FOR RENAME
272      STA A 0,X :STORE CODE IN FCB
273      JSR FMS :CALL FILE MANAGEMENT SYSTEM
274      BEQ RENAME :RENAME WAS OK (THERE WAS NO .BAK)

```

```

276      * CHECK ERROR
277      * IF FILE EXISTS, ASK OPERATOR
278      * FOR PERMISSION TO DELETE.

```

```

279      LDX #00FCB
280      LDA A 1,X :FILE EXISTS CODE
281      CMP A #003
282      BEQ SKIP1

```

```

284      * SOME OTHER FATAL ERROR
285      JMP ERROR

```

```

287      * DROP THROUGH WHEN FILE EXISTS
288      * ASK OPERATOR FOR PERMISSION TO DELETE
289      * 'FILE EXISTS' MESSAGE
290      LDX #00FCB
291      JSR PSTNG :PRINT IT

```

```

292      * GET REPLY
293

```

```

294      JSR GETCHR
295      CMP A #95F :LOWER CASE ?
296      BLS SKIP2
297      * FALL THROUGH IF LOWER CASE
298      SUB A #920 :REMOVE LOWER CASE DIFFERENCE
299      CMP A #Y :IS IT A YES ?
300      BEQ DELETE :IT WAS A YES
301      * DROP THROUGH WHEN NOT TO BE DELETED
302      JMP FIN1 :IT WAS NOT A 'Y'

```

```

304      * YES DELETE THE OLD '.BAK'

```

```

305      LDX #00FCB
306      LDA A #00C :CODE FOR DELETE
307      STA A 0,X :STORE CODE IN FCB
308      JSR FMS :DELETE IT
309      BEQ RENAME
310      JMP ERROR

```

```

312      * MOVE THE NAME FROM SCRATCH AREA, BACK TO
313      * THE FILE NAME AREA.

```

```

315      RENAME LDX #00FCB+4 :POINT TO FILE NAME AREA OF FCB
316      LDA B #11 :COUNTER
317      ANDH LDX A #0 :GET CHARACTER
318      STA A 49,X :MOVE IT
319      INX :BUMP TO NEXT
320      DEC B :DECREMENT COUNT
321      BNE RENAME :KEEP LOOPING UNTIL 11 CHAR MOVED

```

```

323      *-----*
324      * DO IT AGAIN *
325      *-----*
326      RENAME

```

```

328      * OPEN 00FCB FOR 'READ'
329      * IT HAS JUST BEEN NAMED '.BAK'

```


27

```

540 0201 00      INX      SAVER
545 0202 FF 07 48  STX      MNTBYT
546 0205 80 03 57  JGP      MNTBYT
547 0208 5A      DEC B      :DECREMENT COUNTER
548 0209 20 F1      BNE      LOOP7

550      * WRITE THREE SPACES
551 0208 86 20      LBA A #920 :SPACE
552 0208 80 03 57  JGP      MNTBYT :WRITE IT TO MASTER
553 0208 80 03 57  JGP      MNTBYT : * * *
554 0208 80 03 57  JGP      MNTBYT : * * *

558      * WRITE DISK NUMBER TO NEW MASTER
559 0208 80 03 57  JGP      COPYNO

568      * WRITE A CARRIAGE RETURN
569 0208 80 00      LBA A #400 :CARRIAGE RETURN
570 0208 80 03 57  JGP      MNTBYT

583      * GO BACK FOR NEXT DIRECTORY ENTRY
584 020E 7E 02 7C      JMP      GETDIR

587      * ?????????????????????????????????????????????????????????????????
588      * DO YOU WANT ANOTHER DISK ADDED TO MASTER DIRECTORY
589      * ?????????????????????????????????????????????????????????????????

571      * END OF LOOP
572 02F1 CE 04 C8  ENLOOP LBA #0000 :ANOTHER DISK ??
573 02F4 00 71 18  JGP      PSTNRD :POINT IT

575      * GET REPLY
576 02F7 80 71 0F  JGP      GETCNP
577 02FA 81 5F      CNP A #45F :LOWER CASE ?
578 02FC 23 02      BLS      SKIPB
579      * FALL THROUGH IF LOWER CASE
580 02FE 00 20      SUB A #020 :REMOVE LOWER CASE DIFFERENCE
581 0300 81 59      CNP A #'Y :IS IT A YES ?
582 0302 27 02      BEB      SKIPA :IT WAS A YES

585 0304 7E 03 0A      JMP      ALDOME :IT WAS NOT A 'Y'
587 0307 7E 02 3F      BEIPA JGP      NOFILE :GO BACK AND ADD ANOTHER DIRECTORY.

598      * ***** CLOSE FILES AND GO HOME TO FLEX *****
599      *
600      *
601      * WRITE I ASTERISK AND A CARRIAGE RETURN
602      * TO MARK END-OF-FILE.
603 030A 00 2A      ALDOME LBA A #02A :ASTERISK
604 030C 80 03 57  JGP      MNTBYT :WRITE IT TO DISK
605      *
606      * AND NOW THE CARRIAGE RETURN
607 030F 80 00      LBA A #00
608 0311 80 03 57  JGP      MNTBYT :WRITE IT TO DISK
609      *
610      * WRITE END-OF FILE CODE FOR FLEX
611 0314 00 00      LBA A #00B :FLEX END-OF-FILE CODE
612 0316 80 03 57  JGP      MNTBYT

603      *
604      * ALL FINISHED
605 0319 80 70 03  FINI JGP      FNSCLB :CLOSE FILES
606 031C 7E 71 03  JGP      WARMS :DON'T FALL THROUGH SUBROUTINES

610      * ***** ERROR ROUTINES *****
611      * ***** ERROR ROUTINES *****
612      * ***** ERROR ROUTINES *****
613      * ***** ERROR ROUTINES *****
614 031F CE 04 44  INCDIR LBA #0000 :BAD FILE SPEC
615 0322 80 71 18  JGP      PSTNRD :PRINT IT
616 0323 80 71 3C  JGP      RPTERR
617 0328 80 70 03  JGP      FNSCLB :CLOSE FILES
618 032B 7E 71 03  JGP      WARMS :ALL RUN AND RETURN TO DOB

620      * ***** ERROR *****
621 032E 80 71 3C  ERROR JGP      RPTERR :TELL OPERATOR AN ERROR
622 0331 80 70 03  JGP      FNSCLB :CLOSE FILES BEFORE EXIT
623 0334 7E 71 03  JGP      WARMS :RETURN TO DOB.
624      * *****

626      * *****
627      * *****
628      * *****
629      * *****

631      * *****
632      * *****
633      * *****
634 0337 CE 07 3E  COPYNO LBA #01000 :DISK#
635 033A FF 07 48  STX      POINT
636 033D 00 00      LBA B #000 :COUNTER FOR B CHARACTER DISK NAME/NO.
637 033F FE 07 48  COPYNO LBA #0 :
638 0342 A6 00      INX      LBA A 0.0 :GET CHARACTER
639 0344 00      INX      :POINT TO NEXT CHARACTER
640 0345 FF 07 48  STX      POINT :SAVE INDEX REGISTER
641 0348 CE 05 80  LBA #0000 :POINT TO NEW MASTER FOR WRITING
642 034B 80 70 06  JGP      FNSCLB :WRITE CHARACTER THAT IS IN 'A' REGISTER
643 034E 27 03      BEB      SKIPB :ZERO INDICATES NO ERROR
644 0350 7E 03 2E  JGP      ERROR :FATAL ERROR
645 0353 5A      DEC B      :DECREMENT COUNTER
646 0354 20 69      BNE      COPYNO
647 0356 39      RET

```

```

848      * *****
849      * *****
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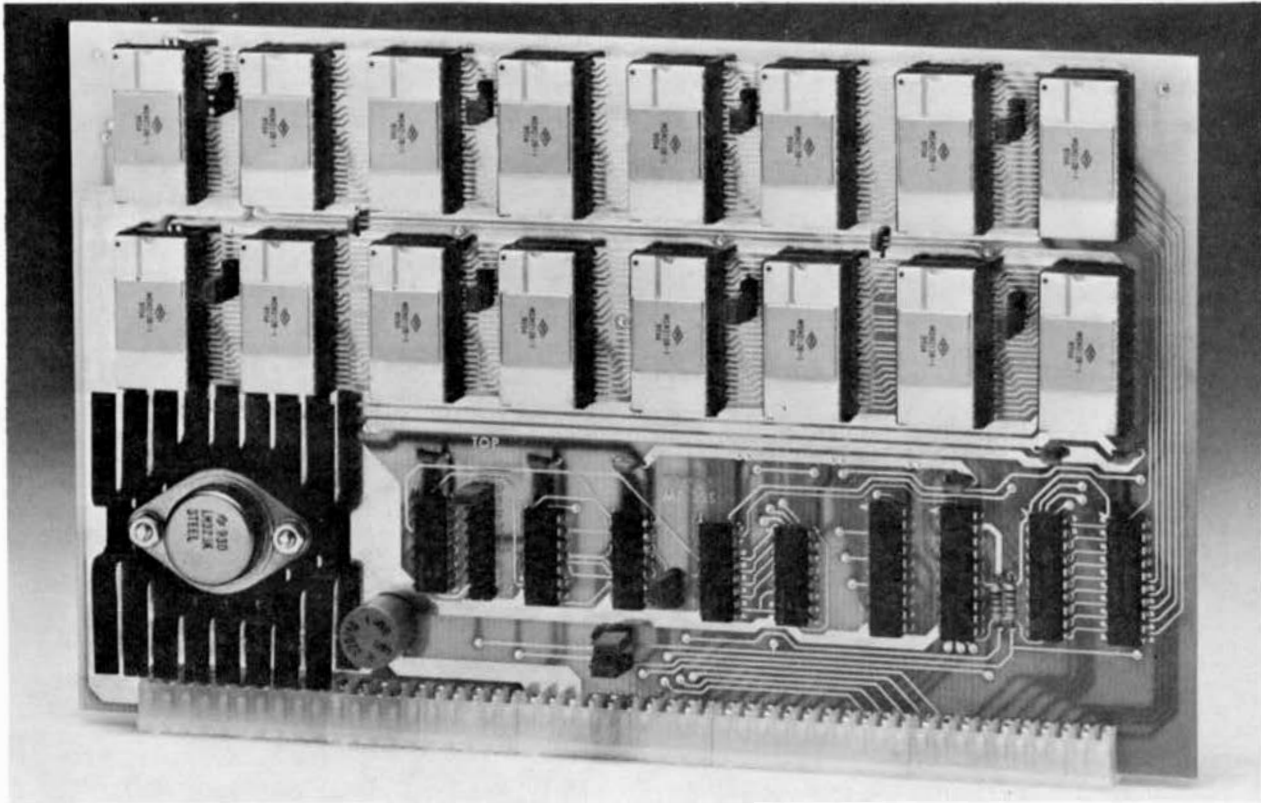
```

```

001 04FC 20 20
002 04FC 04
FCB 004
-----
704 *****
705 * FILE CONTROL BLOCK *
706 *****
707
708 * FILE CONTROL BLOCK 10 197 BYTES LONG.
709 * A SEPARATE BDFCB 10 REQUIRED FOR EACH
710 * OPER FILE.
711 *
712 * THE FILE CONTROL BLOCK CAN BE PLACED
713 * ANYWHERE IN RAM.
714 *
715 * I EXCEPT PAGE ZERO (0-256). I
716
717 *****
718 ** BDFCB WILL BE USED TO READ OLD MASTER ".bak"
719 ** BDFCB(0,0)
-----
721 04FD BDFCB RMB 1 :BYTE 0-FUNCTION CODE
722 04FE ERSTAT RMB 1 :BYTE 1-ERROR STATUS
723 04FF ACTVRY RMB 1 :BYTE 2-ACTIVITY STATUS
724 0500 DRIVED RMB 1 :BYTE 3-DRIVE ALPHABET
725 0501 FNAME RMB 8 :BYTE 4-11-FILE NAME
-----
728 0509 EXTENS RMB 3 :BYTE 12-14-EXTENSION
729 050C RESVRD RMB 2 :BYTE 15-16-RESERVED FUTURE
730 050E STADDR RMB 2 :BYTE 17-18-START DISK ADDRESS
731 0510 ENADDR RMB 2 :BYTE 19-20-END ADDRESS
732 0512 SECTOR RMB 2 :BYTE 21-22-NO. OF SECTORS IN USE
733 0514 RESVUA RMB 5 :BYTE 23-27-RESVRD FUTURE USE
734 0518 LPOINT RMB 2 :BYTE 28-29-FCB LIST POINTER
735 051B POSITH RMB 2 :BYTE 30-31-CURRENT POSITION
736 051D RESVRB RMB 2 :BYTE 32-33-RESERVED FUTURE USE
737 051F DIMOVX RMB 1 :BYTE 34-DATA INDEX
738 0520 RINDEX RMB 1 :BYTE 35-RANDOM INDEX
739 0521 WORKBF RMB 11 :BYTE 36-46-NAME WORK BUFFER
740 052C CURDIR RMB 2 :BYTE 50-52-CURRENT DIRECTORY ADDR
741 052F FINDERL RMB 3 :BYTE 53-55-FIRST DELETED DIR POINT
742 0532 SCPTCE RMB 11 :BYTE 56-63-SCATCH BYTES
743 053B BUFFER RMB 128 :BYTES 64-181-SECTOR BUFFER FOR DATA
-----
743 *****
744 ** WRITER WILL BE USED FOR WRITING THE NEW MASTER
-----
748 0568 WRTFCB RMB 3
749 0569 FNAME1 RMB 1 :BYTE 0-11-FILE NAME
750 056C FNAME2 RMB 1 :BYTE 12-14-EXTENSION
751 056E RESVW2 RMB 2 :BYTE 15-16-RESERVED
752 056F FNAME3 RMB 2 :BYTE 17-18-START DISK ADDR
753 0570 ENADDR2 RMB 2 :BYTE 19-20-END ADDR
754 0572 SECTR2 RMB 2 :BYTE 21-22-NO. OF SECTORS
755 0574 BALNC2 RMB 160
-----
758 *****
759 ** BDFCB WILL BE USED FOR OPENING AND GETTING
760 ** DIRECTORY ENTRIES.
-----
760 0678 DIRFCB RMB 192 :FILE CONTROL BLOCK FOR DIRECTORY
761 0730 FCB RMB 400 :NAME END WITH CR
-----
763 *****
764 * NOTES RE:- DIRECTORY FILE NAMES
765 * :FILE CONTROL BLOCK (LABELLED)
766 * :BYTE 1 IN THE FCB.
767 *
768 * THE FIRST BIT OF THE FILE NAME
769 * WILL BE A ZERO (0) IF THE DIRECTORY NAME
770 * HAS NEVER BEEN USED.
771 * IT WILL BE A ONE (1) IF IS TO BE DELETED
772 * FILE NAME.
773 *****
775 *****
776 * TEMPORARY STORAGE *
777 *****
778 073E DISK2 RMB 8 :STORAGE FOR DISK NUMBER
-----
DIRECTIONS: ADV (VER 20) DENNIS MILLIGAN PAGE 10
778 0748 POINT RMB 2
779 074B SAVER RMB 2
780 *****
783 END START0
NO (ERRORS) DETECTED
SYMBOL TABLE:
ACTVRY 04FF ALDOME 030A ADRTHP 018E BALNC2 05B4
BUFFER 053B COPYIN 033F BDFCB 004 CURDIR 052C
DELETE 01CE DIMOVX 051F DIRFCB 0678 DISK2 073E
DRIVED 0500 DRIVE1 05C0 ENADDR2 0590 ENADDR 0510
ENDAT2 0230 ENDATA 0224 ENDLOOP 02F1 ERROR 032E
ERSTAT 04FE EXISTS 017C EXTENS2 0538 EXTENS 0509
FNAME2 05C1 FNAME 0501 FNAME1 051B FINDERL 052F
FMB 7008 FMBCL5 7803 GETCHW 710F GETDIR 027C
GETFCL 7127 GDSB 0382 GDT11 0286 INBUF 7115
INCORT 031F LOOP0 014A LOOP1 0240 LOOP6 02A2
LOOP7 02CC LPOINT 0519 MORDAT 0200 MSG0 0363
MSG1 0347 MSG2 040A MSG3 0435 MSG4 047A
MSG5 044A MSG6 043C NOERR1 0125 NOFIL4 018A
NOFIL5 0178 NOFILE 02CF NOTCH 7121 PCALF 711E
PERIOD 028F POINT 0746 PTRIND 0518 PSTIND 7118
RDFCB 04FB RENAM2 0180 RENAM3 01E2 RENAND 01EC
RENAME 0100 RESVR2 05CC RESVUA 01E2 RESVRB 051D
RESVW2 056E RINDEX 0520 RPTERR 713C SAVER 074B
SCPTCE 0532 SECTOR 0512 SECTR2 05B2 SETEXT 712D
SKIP4 0110 SKIP1 0180 SKIP4 0353 SKIP2 01C7
SKIP4 01FE SKIP7 0281 SKIP8 0300 SKIP4 0307
SPACE2 0287 SPACES 029C STADDR 050E START 0103
START 0100 START1 0120 STRTAB 0506 UN 0102
WARR1 7103 WORKBF 0171 WRTFCT 0357 WRTFCB 05B0

```


31



UNIVERSAL STATIC MEMORY

- ★ 32K bytes-ROM, RAM, EPROM or a combination
- ★ SS-50 A&C compatible with 16 and 20 bit address decoding
- ★ Compatible with all SWTPC 6800 and 6809 computers
- ★ 2.0 MHz - 5.0 Volts only

This is the most versatile memory card you can buy. Our S-32 may be populated with up to 32K of static RAM, EPROM, or ROM, or any 4K block combination of these that you may desire. Any 5-volt 2716 pinout compatible memory may be used in this card. Any 4K block of memory may be jumper block programmed for RAM or ROM use. This feature makes this the ideal memory for those process control applications that require a mixture of ROM and RAM

memory. The board is fully compatible with all SWTPC 6800 and 6809 computers.

The power requirement for the board is only 1.75 amps at 5.0 volts with a full 32K of RAM installed.

S-32 Circuit card only	\$124.50
S3216 with 16K of RAM	\$375.00 ea.
S3232 with 32K of RAM	\$575.00 ea.



SOUTHWEST TECHNICAL PRODUCTS CORPORATION
 219 W. RHAPSODY
 SAN ANTONIO, TEXAS 78216 (512) 344-0241

WE HAVE A 6809 FOR YOU

POWER SUPPLY

Modular plug-in construction with computer grade filters and a 25 AMP rectifier bridge. Blower fan is standard equipment. All connections to the power line are beneath the safety shield.

INTERFACE

Convenient serial or parallel I/O cards have DB-25 connectors mounted directly on the circuit board. Up to 16 interface devices may be installed on the address decoded I/O bus. Programming strips are provided for input and output baud rate selection on each port. All outputs are fully buffered.

PROCESSOR

The world's most powerful eight-bit processor, the Motorola MC6809, plus 2K byte monitor ROM that is 2716 EPROM compatible and full buffering on all output lines. Built-in multiuser capability, just add I/O cards to operate a multi-terminal system.

CABINET

Rugged 1/8 inch alloy aluminum base plate combined with a solid 1/8 inch alloy aluminum cover for unsurpassed protection. All interior metal is conversion coated. The cover is finished with a super tough textured epoxy.

MEMORY— You can purchase the computer with either 8K bytes of RAM memory (expandable to 56K), or with the "S" series 64K bytes of RAM memory expandable to 768 K.

PERIPHERALS— The wide range of peripheral hardware that is supported by the 6809 includes: dot matrix printers (both 80 and 132 column), IBM Electronic 50 typewriter, daisy wheel printers, 5-inch floppy disk system, 8-inch floppy disk systems and a 16 megabyte hard disk.

SOFTWARE— The amount of software support available for the 6809 is incredible when you consider that it was first introduced in June, 1979. In addition to the FLEX9 operating system, we have a Text Editor, Mnemonic Assembler, Debug, Sort-Merge, BASIC, Extended BASIC, MultiUser BASIC, FORTRAN, PASCAL and PILOT.

69/K Computer Kit with 8K bytes of memory	\$ 660.00
69/A Assembled Computer with 8K bytes of memory	\$ 799.00
09/ Assembled Computer "S" series with 64K bytes of memory	\$1,835.00



SOUTHWEST TECHNICAL PRODUCTS CORPORATION
219 W. RHAPSODY
SAN ANTONIO, TEXAS 78216
(512) 344-0241

```

1488 BR=BP+RC-ET+12/P1
1490 T3=12*65:T4=12-BR:REM TIME,BASIC,SUNSET: TIME,BASIC,SUNRISE
1500 T5=T4+T2:T6=T3+T2:REM TIME,SUNRISE: TIME,SUNSET
1510 PEM FRACTIONAL, AVAILABLE SUN
1520 FA=0.5*(PC+PA)+FU*(M3-M4)+SIN(PC+FU)/PI)
1530 PRINT:PRINT
1540 AG=T5+P1/12:TAB="TIME"IV#="Sunrise at":@OSUB 2240
1550 =T6+P1/12:TAB="TIME"IV#="Sunset at":@OSUB 2240
1560 GOTO 1590
1570 PRINT "You are in the 'ix8' winter--the sun doesn't rise."
1580 FA=0
1590 PRINT "Sunlight available at the top of the atmosphere is"
1600 PRINT 1.688569+FA: Joules per sq.m."
1610 INPUT "If this is the last date, input 0 "JC
1620 IF C#="0" THEN GOTO 1630 ELSE GOTO 220
1630 END
1640 REM
1650 REM SUBROUTINE TO COMPUTE JULIAN DATE
1660 REM
1670 Y2=YC+4712:PEM YEARS SINCE YEAR ZERO
1680 HL=INT((Y2-1)/4):REM NO. OF LEAP YEARS
1690 DJ=365*Y2+HL
1700 IF YC<1905 THEN GOTO 1700
1710 DJ=DJ-10
1720 MC=INT((YC-1501)/100):REM MC IS NO.OF CENT.YRS.SINCE 1903
1730 MD=INT((YC-1501)/100):REM MD IS NO.OF CENT.LEAP YRS.
1740 DJ=DJ-MC+MD
1750 REM
1760 REM DEAL WITH MONTH AND DAY
1770 REM
1780 DJ=DJ+FR(MC)+DC
1790 IF 4+INT(YC/4)=YC AND MC=3 THEN DJ=DJ+1
1800 IF YC=1582 AND ((MC=10 AND DC)=15) OR MC=11 THEN DJ=DJ-10
1810 RETURN
1820 REM
1830 REM SUBROUTINE TO COMPUTE MEAN ANOMALY. TAKES T.D
1840 REM RETURNS M
1850 M1=-1.92417*(1.58E-4+3.0E-6*T)+T+0.9856=0
1860 IF M1>360 THEN M1=M1-360:INT(M1/360)
1870 M=M1+P1/100
1880 RETURN
1890 REM
1900 REM SUBROUTINE TO COMPUTE ECCENTRICITY: TAKES T, RETURNS EC
1910 REM
1920 EC=0.016731-(4.08E-5+1.26E-7*T)*T
1930 RETURN
1940 REM
1950 REM
1960 REM SUBROUTINE TO COMPUTE OBLIQUITY OF ECLIPTIC
1970 REM TAKES T, RETURNS EP (EPSILON)
1980 REM
1990 EP=(23.4523-(1.30123E-2+(1.64E-6-5.03E-7*T)*T)*T)*P1/100
2000 RETURN
2010 REM
2020 REM
2030 REM SUBROUTINE TO COMPUTE MEAN LONGITUDE OF PERIGEE
2040 REM TAKES T.D, RETURNS OM (OMEGA)
2050 REM
2060 OM=(201.221+(4.53E-4+3.0E-6*T)*T+4.70684E-5*T)*P1/100
2070 REM
2080 REM
2090 REM SUBROUTINE TO CALCULATE LONGITUDE OF ASCENDING NODE
2100 REM OF LUNAR ORBIT (TAKES T.D: RETURNS LL)
2110 REM
2120 LL=239.183+(2.078E-3+2.0E-6*T)*T
2130 LL=LL-0.529539*T
2140 LL=LL+P1/100
2150 RETURN
2160 REM
2170 REM
2180 REM SUBROUTINE TO PRINT TIME OR ANGLE
2190 REM IN XXX:XXX:XXX:XXX FORMAT
2200 REM TIME OR ANGLE ASSUMED TO BE IN RADIANS
2210 REM
2220 REM ROUTINE TAKES TAB,V8,AG, AND OUTPUTS THEM
2230 REM
2240 IF LEFT$(TAB,1)<>"T" THEN GOTO 2260
2250 FC=12:UL#="Hours":GOTO 2270
2260 FC=100:UL#="Degrees"
2270 X1=FC*ABS(AG)/P1:X2=INT(X1):X3=X2-(X1-X2):X4=INT(X3)
2280 X5=60*(X3-X4):X6=0.001*INT(X5/1000)
2290 IF X2<0 THEN X2=SGN(AG)*X2
2300 IF X2=0 AND X4<0 THEN X4=SGN(AG)*X4
2310 IF X2=0 AND X4=0 THEN X4=SGN(AG)*X6
2320 PRINT V8,TAB:20)X2:11)X4:11)X6:UL#
2330 RETURN

```

STEVE GRIFFITH
P.O. BOX 791
SAFFORD, ARIZONA
85546

Mr. Don Williams
68-Micro Journal
3018 Hamill Road
Hixson, Tennessee
37343

May 21, 1981

Dear Mr. Williams,

Again, I wish to thank you for the subscription to 68-Micro Journal. I am learning much by reading the articles. I would like to ask if you could possibly run the following letter in your magazine? It is a request for assistance.

I am trying to learn microcomputer hardware design and programming. I have a SMTPC-6800 HUKAUG microcomputer. This consists of a 6800 CPU, motherboard, 4K RAM board, and MP-8 Serial Board. This was donated to me by a guy in New York who had updated to a DAC system. I also have a power supply and cassette interface donated by Midwest Scientific Instruments, a 14K static RAM board from Digital Research, and a 34 floppy disk from Siemens Corporation. I also have a George Risk Industries model 753 keyboard. I am incarcerated at the Safford Conservation Center. I have a hobbyshop where I work and study computer design and programming. I work as the librarian here, and this allows me to obtain text books on this field, which I have studied for almost two years now. My main problem is that I need a RS-232 terminal something like the CT-64 or similar to connect to my computer. I have no way of programming my computer, not of reading the results. I do have a small black and white TV I can use as a monitor, and I have a rf modulator that I built. I earn 7.20 per hour and it is very difficult for me to purchase a terminal. I would appreciate anything I can get to help me achieve my goal. I am very close to having a complete working system. I still have until 1983 before I am released, and would like to use this time nondestructively. If you can't donate anything, I would still like to hear from anyone who wishes to write. I can use advice in learning also. Thank you very much for your time and consideration in this matter. I hope to hear from you soon.

Sincerely yours,
Steve Griffith
Steve Griffith

We have lined up a large number of reviewers for the many varied products, both hardware and software, that are advertised in 68 Micro Journal, that is most all except UNIFLEX™ from TSC. However, we need someone who has TSC UNIFLEX up and running to do occasional reviews of UNIFLEX software. The requirements are simple: we need the review back on a priority basis, also we need a complete review of the product (see past reviews in 68 Micro Journal) not just a hash-over of the manual. The reviewer gets to keep the product reviewed for his/her effort in accomplishing an in-depth review.

If you are interested please drop me a line and I will let you know as I need a review.

DMW - - -

OS-9 Procedures

EDITOR, '68 MICRO,

HERE IS ANOTHER OS-9 PROGRAM FOR YOUR READERS. THIS ONE IS A TEXT EDITOR WHICH DUPLICATES THE BASIC09 EDITOR. IT IS WRITTEN IN BASIC09 AND RUNS IN A 40K SYSTEM. I WROTE IT FOR MY STUDENTS IN COMPUTER SCIENCE, A COURSE I TEACH FOR UPPER LEVEL MATH AND SCIENCE STUDENTS AT ST. MARY OF THE PLAINS COLLEGE. BECAUSE IT DUPLICATES THE BASIC1009 EDITOR MODE, IT MAKES THE TRANSITION FROM BASIC09 TO OS-9 EASIER.

OF COURSE IT IS NOT RESTRICTED TO USE WITH THE ASSEMBLER, ANY TEXT FILE CAN BE CREATED AND/OR EDITED BY THIS PROGRAM. THIS LETTER IS AN EXAMPLE OF ONE OF ITS USING. BASIC09 FILES MAY ALSO BE EDITED, ALTHOUGH THEY CAN NOT BE ORIGINATED WITH THIS EDITOR. SINCE IT IS A LINE ORIENTED EDITOR, IT IS NOT AS FLEXIBLE AS A TRUE WORD PROCESSOR.

ALTHOUGH I DO NOT FEEL THAT I AM REALLY A GOOD BASIC09 PROGRAMMER (THIS IS THE FIRST LARGE PROGRAM I'VE WRITTEN IN BASIC09), I DO THINK THIS PROGRAM DEMONSTRATES MANY OF THE POWERFUL FEATURES OF THIS NEW LANGUAGE. IT ALSO RUNS MUCH FASTER THAN SIMILAR PROGRAMS I OR MY STUDENTS HAVE WRITTEN IN OTHER BASICS IN THE PAST.

ONE OF THE IMPORTANT FEATURES OF THIS PROGRAM IS THAT THE ENTIRE TEXT FILE IS RESIDENT IN MEMORY AT ALL TIMES. THIS FEATURE ELIMINATES THE EXCESSIVE WEAR ON DISK DRIVES ASSOCIATED WITH MANY TEXT EDITORS. IT ALSO LIMITS THE SIZE OF THE FILE TO 4000 CHARACTERS IN A 40K SYSTEM. THIS IS NOT A PROBLEM WITH ASSEMBLER FILES SINCE THE OS-9 ASSEMBLER WILL LINK FILES.

THIS PROGRAM IS STRUCTURED WITH 161 CAREFULLY CONTROLLED AND INPUT LOOP PROCEDURES WHICH CAN CALL SETUP, SAVE, INPUT, AND EDITING PROCEDURES. THESE PROCEDURES RECEIVE PARAMETERS, AS ABSOLUTE ADDRESSES, FROM THE MAIN PROCEDURE AND CAN IN TURN PASS THESE, AND OTHER PARAMETERS, ON TO THE NEXT

LEVEL OF PROCEDURES. THE BASIC STRUCTURE INCLUDES THREE LEVELS: THE MAIN PROCEDURE, THE PROCEDURES IT CALLS, AND THE PROCEDURES THEY CALL. BY USING THIS TYPE OF STRUCTURE, I WAS ABLE TO WORK ON ONE PROCEDURE AT A TIME. THIS GREATLY SIMPLIFIES DEBUGGING.

THE PROCEDURES CALLED BY THE EDITING PROCEDURE MAKE UP THE BULK OF THE PROGRAM. ALL BUT ONE OF THESE PROCEDURES DUPLICATE BASICOS9 EDITING FUNCTIONS. THE NEW FUNCTION, J, ALLOWS CONTINUOUS INSERTION OF TEXT WITHOUT REPEATED PROMPTS FROM THE EDITOR. IN BASICOS9 EACH LINE IS CHECKED FOR SYNTAX AS IT IS ENTERED. THIS PREVENTS THE USE OF THIS TYPE OF COMMAND. IN A GENERAL PURPOSE TEXT EDITOR IT IS VERY DESIRABLE. SO I TOOK THE LIBERTY OF ADDING IT.

OTHER DEVIATIONS FROM BASICOS9 C MADE WERE MADE TO SIMPLIFY THE PROGRAM AND AVOID FEATURES I FELT WERE POTENTIALLY TROUBLESOME. THESE CHANGES INCLUDE: ELIMINATION OF THE REPEAT FEATURE ON THE SEARCH/CHANGE COMMAND; NO LISTING OF LINES PRIOR TO THE CURRENT LINE (ALTHOUGH YOU MAY STILL LIST THE ENTIRE FILE); AND SOME MINOR CHANGES IN THE DELETE FUNCTION.

THE POTENTIAL USER SHOULD FIRST READ THE REM SECTIONS OF THE PROCEDURES. THESE INCLUDE BRIEF COMMENTS ON THE CHANGED FEATURES. THE PROCEDURES SHOULD PROPERLY BE ENTERED WITHOUT THE REM LINES. IF YOU HAVE A 48K SYSTEM, YOU CAN'T RUN THE PROGRAMS WITH THE REM LINES. THEY TAKE UP NEEDED MEMORY. FOR NORMAL USE THE PROCEDURES SHOULD BE PICKED (A NICE BASICOS9 FEATURE WHICH RESULTS IN BATTERY EXECUTABLE CODE WHICH CAN'T BE LISTED) AND THE ENTIRE PROGRAM RUN FROM OS-9 BY ENTERING EDIT 879. OS-9 WILL AUTOMATICALLY LOAD BASICOS9 AND THE INDIVIDUAL PROCEDURES AS NEEDED. (ONCE A PROCEDURE HAS BEEN LOADED INTO MEMORY, IT REMAINS THERE UNTIL YOU EXIT THE PROGRAM. THIS IS ACCOMPLISHED BY ENTERING 0 AND RESPONDING TO THE "ARE YOU SURE" PROMPT WITH V. THIS WILL RETURN YOU TO OS-9 WITH AN ERROR MESSAGE, THAT IS OK. IT WAS THE SIMPLEST WAY TO GET RID OF THE EXTRA INFORMATION OF SHELL GENERATED BY RUNNING THE PROGRAM.

I PLAN TO ADD MORE WORD PROCESSING CAPABILITIES AND THE ABILITY TO WORK WITH LONGER FILES TO THIS EDITOR. PERHAPS OTHER 680 MICRO READERS WILL SHARE THEIR OWN IMPROVEMENTS WITH US.

SINCERELY,

Mark J. Boyd

MARK J. BOYD

ST MARY OF THE PLAINS
BOBBE CITY, KS 67001

PROCEDURE EDIT

```
0000 REM THIS IS THE MAIN CONTROL AND INPUT LOOP.
0020 REM IT CALLS SETUP,GETC,SAME_STRING,AND EDIT_STRING.
0030 REM THE USE OF A STRING ARRAY, INSTEAD OF A STRING.
0090 REM SAVES STACK SPACE.
0095 DIM T$STRING(4000):STRING(1):C$STRING(STRING(00)):POSITION,LENGTH
      ,1:INTEGER):A$:STRING(1)
009A 10 RUN SETUP(T$STRING,LENGTH)
0100C POSITION=1
00FB 20 PRINT "E1": RUN GETC(C$STRING,1)
0111 C$STRING=LEFT$(C$STRING,1)
0110 IF C$STRING="PESTART" THEN INPUT "ARE YOU SURE? ",A$
0145 IF A$="Y" THEN 10:ENDIF
0157 IF C$STRING="D" THEN INPUT "ARE YOU SURE? ",A$
0179 IF A$="Y" THEN 30:ENDIF
0180 IF C$STRING="SAVE" THEN RUN SAME_STRING(T$STRING,LENGTH):GOTO 20
      20:ENDIF
019F RUN EDIT_STRING(T$STRING,C$STRING,POSITION,LENGTH):GOTO 20
01CC 30 @END
```

PROCEDURE SETUP

```
00A0 REM THIS PROCEDURE INITIALIZES THE STRING ARRAY TO NULLS
00B7 REM AND ASKS THE USER FOR A DEFAULT FILENAME. IF A " " IS
00C0 REM IS ENTERED, THE USER STARTS WITH AN EMPTY FILE.
00F7 PARAM T$STRING(4000):STRING(1):LENGTH:INTEGER
00C6 DIM I:INTEGER):H$:STRING):PATH:BYTE
00C9 ON ERROR GOTO 11
00E7 FOR I=1 TO 4000
00E0 T$STRING(I)=" "
00E5 NEXT I
00F5 10 PRINT "FILENAME? ",I: IF A$=" " THEN 20
0110 OPEN WITH:FILE
```

```
0125 GET WITH:FILE
0137 10 C$STRING="" IF L$="" THEN PRINT "FILE NOT FOUND":GOTO
      5
0190 ELSE CLOSE WITH:FILE:ENDIF
0166 20 RUN L$=L$+T$STRING,LENGTH)
0178 PRINT LENGTH: " L$+T$STRING: IF " "
0193 IF LENGTH>4000 THEN 14:PRINT "FILE TOO LONG, PART OF FILE NOT COPIED"
01C9 ENDIF
```

PROCEDURE EDIT_STRING

```
0000 REM THIS PROCEDURE IS THE CONTROL LOOP FOR ALL STRING
0005 REM EDITING FUNCTIONS. IT INCLUDES A COMMAND SEPARATOR AND
0007 REM A COUNT SEPARATOR FOR USE WITH SOME OF THE FUNCTIONS.
0009 REM THE COUNTING FOR "+" AND "-" IS DONE HERE. WHILE "D"
000C REM AND "L" CONTAIN THEIR OWN COUNT ROUTINES. THE "+" AND "C"
0010 REM ROUTINES DO NOT ALLOW COUNTED EXECUTION.
0012 PARAM T$STRING(4000):STRING(1):C$STRING(STRING(00)):POSITION
      ,LENGTH:INTEGER
0016 DIM H,COUNT:BYTE):H$:STRING(1):H$:STRING(2)
0018C ON ERROR GOTO 20
0019B H=LEFT$(C$STRING,1):H$=LEFT$(C$STRING,2):C$STRING=RIGHT$(C$STRING,
      LEN)
00185 H$=LEFT$(C$STRING,2): IF ASC(H$)<=39 AND ASC(H$)>=30 THEN
      COUNT=H$+48
001C0 ELSE COUNT=1:ENDIF
001C6 IF C$STRING="" THEN COUNT=255:ENDIF
00201 IF H$="C" OR H$="S" THEN RUN C$STRING,C$STRING,POSITION,LENGTH
      ,A$:ENDIF
00205 IF H$="L" THEN RUN L$(T$STRING,COUNT,C$STRING,POSITION,LENGTH)
      :ENDIF
00261 IF H$=" " THEN RUN S$(T$STRING,POSITION,LENGTH,C$STRING):ENDIF
00288 IF H$="I" THEN RUN I$(T$STRING,POSITION,LENGTH):ENDIF
0029A IF H$="D" THEN RUN D$(T$STRING,POSITION,LENGTH,COUNT):ENDIF
002A 10 IF H$="+" OR H$="-" THEN RUN P$(T$STRING,POSITION,LENGTH,COUNT
      ):ENDIF
00302 IF H$="=" THEN RUN R$(T$STRING,POSITION,COUNT):ENDIF
00324 COUNT=COUNT-1
0032F IF COUNT>0 THEN 10
0033E IF A$="L" THEN END:ENDIF
0034E COUNT=1:C$STRING=""
0035C PRINT " ": RUN L$(T$STRING,COUNT,C$STRING,POSITION,LENGTH)
00380 20 END
```

PROCEDURE GETC

```
0000 REM THIS PROCEDURE IS NECESSARY TO AVOID THE "COMM AS A
0057 REM DELIMITER" PROBLEM. IT ACCEPTS ANY CHARACTER AS INPUT
0067 REM AND IGNORES CONTROL CHARACTERS OTHER THAN CR, CONTROL H,
009A REM AND CONTROL X. THESE HAVE THEIR USUAL FUNCTIONS.
00D0 PARAM C$STRING(00):STRING(1):I:INTEGER
00F4 DIM A$:STRING(1)
0100 I=0
0107 LOOP
0109 GET @,A$:I=I+1
0110 EXITIF ASC(A$)=14: THEN I=I-1:ENDIF
0138 IF ASC(A$)=13 AND I>1 THEN I=I-2:PRINT CHR$(32):PRINT
      CHR$(8)
0162 ELSE IF ASC(A$)=13 AND I>1 THEN I=I-1
0183 REPEAT
0195 I=I-1:PRINT CHR$(8):PRINT CHR$(32):PRINT CHR$(
      8)
0112 UNTIL I=0
0116 ELSE IF ASC(A$)=15 THEN C$STRING(I)=A$
0180 ELSE I=I-1:ENDIF
018C OKIF
018A ENDIF
018C EXITIF I=0: THEN:DOEXIT
01EC ENDOOP
```

```

01F0 PRINT
01F2 PUT GETRIP(C$STRING)
PROCEDURE TLEN
0000 REM TLEN DETERMINES THE LENGTH OF THE FILE BY SEARCHING FOR
0001 REM THE FIRST NULL ELEMENT. LENGTH IS USED BY MOST OF THE
0002 REM OTHER PROCEDURES.
0006 FROM T$TRNG(4000)+STRING(1); LENGTH=INTEGER
0008 LENGTH=0
0009 REPEAT
0009 LENGTH=LENGTH+1
0009 UNTIL T$TRNG(LENGTH)="" OR LENGTH=4000
0009 IF LENGTH=4000 THEN LENGTH=LENGTH-1 \ ENDIF

```

```

PROCEDURE B$TRIP
0000 REM GETC USED GET TO INPUT CHARACTERS. THIS GIVES CHARACTERS
0001 REM WITH OUT ? HIGH. B$TRIP CLOSSES THIS BY APPENDING THE
0002 REM STRING AGAIN TO A BYTE FROM THE SUBROUTINE 128 FROM
0003 REM EACH ELEMENT. HAVE THE NEXT CHARACTER PASSING WITH PROLES
0004 REM THIS POSSIBLE!
0005 FROM C$TRNG(4000)+STRING(1) UNTIL
0006 FOR I=1 TO 255
0007 IF C$TRNG(I) > 127 THEN C$TRNG(I)=C$TRNG(I)+128
0008 ENDIF
0009 NEXT I

```

```

PROCEDURE L
0000 REM L IS THE LISTING PROCEDURE WHICH LISTS ONE OR MORE LINES
0001 REM STARTING FROM THE CURRENT POSITION OR THE WHOLE FILE.
0002 REM IT DOES NOT HAVE A "" FUNCTION, BUT IT DOES + THE
0003 REM THE CURRENT LINE.
0004 FROM T$TRNG(4000)+STRING(1); COUNT=INTEGER; C$TRNG(STRING(1)
0005 ); POSITION=LENGTH+INTEGER
0006 DIM POINTER=INTEGER; NO=STRING(1)
0007 POINTER=POSITION
0008 IF C$TRNG="" THEN POINTER=1 \ ENDIF
0009 IF POINTER=LENGTH THEN \ END \ ENDIF
0010 IF POINTER=1 THEN PRINT T$TRNG(1); \ ENDIF
0011 10 REPEAT
0012 POINTER=POINTER+1
0013 PRINT T$TRNG(POINTER);
0014 IF POINTER=POSITION THEN PRINT "" \ ENDIF
0015 UNTIL T$TRNG(POINTER)=CHR(13) OR POINTER=LENGTH
0016 IF POINTER=LENGTH THEN PRINT CHR(13) \ END \ ENDIF
0017 IF C$TRNG="" THEN 10
0018 COUNT=COUNT+1 \ IF COUNT>0 THEN 10
0019 END

```

```

PROCEDURE D
0000 REM THIS PROCEDURE DELETES ONE OR MORE LINES, STARTING FROM
0001 REM THE CURRENT POSITION. TO DELETE THE ENTIRE FILE USE @ESTRIP.
0002 FROM T$TRNG(4000)+STRING(1); POSITION=LENGTH+INTEGER; BOUNT
0003 =0
0004 DIM POINTER=INTEGER; I=INTEGER
0005 IF POSITION=LENGTH THEN END \ ENDIF
0006 IF POSITION=1 THEN POSITION=0 \ ENDIF
0007 POINTER=POSITION
0008 REPEAT
0009 REPEAT
0010 POINTER=POINTER+1
0011 UNTIL T$TRNG(POINTER)=CHR(13) OR POINTER=LENGTH
0012 COUNT=BOUNT+1
0013 UNTIL COUNT=0 OR POINTER=LENGTH
0014 COUNT=1
0015 IF POINTER=LENGTH THEN
0016 POINTER=POINTER-1 \ T$TRNG(POINTER)="" \ LENGTH=LENGTH-1
0017 UNTIL POINTER=1 OR POINTER=0
0018 ELSE 1=0

```

```

0009 REPEAT
0010 I=I+1
0011 T$TRNG(POSITION+1)=T$TRNG(POSITION+1)
0012 UNTIL POINTER=1+LENGTH
0013 LENGTH=LENGTH-(POINTER-POSITION)
0014 ENDIF
0015 IF POSITION=0 THEN POSITION=1 \ ENDIF
PROCEDURE R
0000 REM THIS IS THE JUMP FORWARD ONE LINE PROCEDURE. IT IS
0001 REM CALLED BY "H" OR "H" COMMANDS. IF H= THEN YOU GET THE EOF.
0002 FROM T$TRNG(4000)+STRING(1); POSITION=LENGTH+INTEGER; COUNT
0003 =0
0004 IF COUNT=255 THEN POSITION=LENGTH+COUNT+1 \ ENDIF
0005 IF POSITION=LENGTH THEN END \ ENDIF
0006 RETURN
0007 POSITION=POSITION+1
0008 UNTIL T$TRNG(POSITION)=CHR(13) OR POSITION=LENGTH

```

```

PROCEDURE H
0000 REM THIS IS THE JUMP BACK ONE LINE PROCEDURE. IT IS
0001 REM CALLED BY "H". IT IS MISSING THAT IT DROPS UP
0002 REM ONE LINE. IF H IS + THEN YOU GET EOF.
0003 FROM T$TRNG(4000)+STRING(1); POSITION=INTEGER; COUNT=0
0004 IF COUNT=0 THEN POSITION=1 \ COUNT=1 \ ENDIF
0005 IF POSITION=1 THEN END \ ENDIF
0006 REPEAT
0007 POSITION=POSITION-1
0008 UNTIL T$TRNG(POSITION)=CHR(13) OR POSITION=1
0009 END

```

```

PROCEDURE S
0000 REM THIS IS THE " " COMMAND PROCEDURE. IT INSERTS ONE LINE
0001 REM FOLLOWING THE " " INTO THE FILE IN FRONT OF THE CURRENT
0002 REM LINE.
0003 FROM T$TRNG(4000)+STRING(1); POSITION=LENGTH+INTEGER; TEMP
0004 =STRING(1)
0005 DIM L=INTEGER
0006 FROM T$TRNG(TEMP)
0007 L=LENGTH+1
0008 IF L=4000 THEN 10
0009 IF POSITION=LENGTH THEN
0010 REPEAT
0011 T$TRNG(L)=T$TRNG(M) \ L=L-1 \ M=M+1
0012 UNTIL M=POSITION+1
0013 ENDIF
0014 IF POSITION<1 THEN T$TRNG(POSITION)=CHR(13) \ POSITION=POSITION
0015 +1 \ ENDIF
0016 FOR I=1 TO N
0017 T$TRNG(POSITION)=M$TRNG(TEMP,I) \ POSITION=POSITION+1
0018 NEXT I
0019 T$TRNG(POSITION)=CHR(13)
0020 LENGTH=LENGTH+1
0021 IF T$TRNG(POSITION)="" THEN T$TRNG(POSITION)=CHR(13) \ ENDIF
0022 END
0023 PRINT "NOT ENOUGH ROOM. "1 4000-M1 " SPACES LEFT"

```

```

PROCEDURE C
0000 REM THIS IS THE ONLY PROCEDURE THAT IMPLEMENTS TWO FUNCTIONS,
0001 REM "S" AND "C". THE "S" FUNCTION SEARCHES, STARTING FROM THE
0002 REM CURRENT POSITION, FOR THE STRING ENCLOSED BY THE DELIMITER
0003 REM FOLLOWING IT. "C" SEARCHES AND CHANGES THE STRING TO THE ONE
0004 REM FOLLOWING THE SECOND OCCURENCE OF THE DELIMITER. AS IN
0005 REM BASIC99 E NONE, THE FINAL DELIMITER IS OPTIONAL.
0006 FROM T$TRNG(4000)+STRING(1); C$TRNG(STRING(1)); POSITION
0007 =LENGTH+INTEGER; R$=STRING(1)
0008 DIM R$=TEMP(4000)+STRING(1); POINTER=INTEGER; I=1; M=1; N=1; INTEGER

```

```

0180 00=LEFT$(CSTRING,1) \ LEN(CSTRING)-1 \ STRINGRIGHT$(CSTRING,
      1)
0180 01E0 01=SUBSTR(00,CSTRING)-1
0180 01E7 01=0
0200 0200 FOR I=1 TO 11
0210 0210 TOP(I)=MID$(CSTRING,1,1)
0220 0220 NEXT I
0230 0230 I=0
0230 0230 FOR POINTER=POSITION TO LENGTH
0240 0240 IF TSTRING(POINTER)=TEMP(I) THEN
0250 0250 F=1
0260 0260 FOR J=1 TO 11
0270 0270 EXITIF TSTRING(POINTER+J)>TEMP(I+J) THEN F=0 \ EXITIF
0280 0280 NEXT J
0290 0290 EXITIF F=1 THEN \ EXITIF
0300 0300 NEXT POINTER
0310 0310 IF POINTER=LENGTH THEN PRINT "DON'T FIND " I LEFT$(CSTRING,
      10) \ CLR \ EXITIF
0320 0320 IF F=0 THEN
0330 0330 00=LEFT$(CSTRING,1) \ STRINGRIGHT$(CSTRING,1)
0340 0340 IF 00=RIGHT$(CSTRING,1) THEN CSTRING=LEFT$(CSTRING,1) \
      0350 0350 00=1 \ EXITIF
0360 0360 I=I+1
0370 0370 IF I=0 THEN
0380 0380 FOR J=LENGTH TO POINTER+1 STEP -1
0390 0390 TSTRING(J+1)=TSTRING(J)
0400 0400 NEXT J
0410 0410 EXITIF
0420 0420 IF I=0 THEN
0430 0430 FOR J=POINTER-1 TO LENGTH
0440 0440 TSTRING(J+1)=TSTRING(J)
0450 0450 NEXT J
0460 0460 EXITIF
0470 0470 LENGTH=LENGTH+1
0480 0480 POINTER=POINTER+1
0490 0490 WHILE L>0 DO
0500 0500 TSTRING(POINTER+1)=MID$(CSTRING,1,1) \ POINTER=POINTER+1
      0510 0510 \ L=L-1
0520 0520 DO WHILE
0530 0530 EXITIF
0540 0540 RUN HKTSTRING,POINTER,COUNT \ POSITION=POINTER

```

PROCEDURE 1

```

0000 0000 REM THIS PROCEDURE IMPLEMENTS HKTSTRING NOT FOUND IN BASIC99
0010 0010 REM C MODE. IT ALLOWS YOU TO ENTER TEXT DIRECTLY, AS MANY LINES
0020 0020 REM AS DESIRED, INTO THE FILE. ENTRY IS TERMINATED BY ENTERING
0030 0030 REM A CR AT THE START OF A LINE. JUST ENTER 1 CR TO START.
0040 0040 FROM TSTRING(4000) STRING(1) POSITION,LENGTH INTEGER
0050 0050 DIM TOP$(STRING(100)) \ INTEGER
0060 0060 PRINT
0070 0070 LOOP
0080 0080 RUN GETC(TOP,1)
0090 0090 TEMP=LEFT$(TOP,1)
0100 0100 EXITIF I=0 THEN DO \ EXITIF
0110 0110 RUN SKTSTRING,POSITION,LENGTH,TEMP
0120 0120 GOTO 0070

```

Robertson Electronics
1003 Warm Sands Dr. SE
Albuquerque, NM 87123

22 September, 1981

Attn: Mr. Don Williams
68 Micro Journal
5900 Cassandra Smith
Hixson, TN 37343

Dear Don;

Robertson Electronics is proud to announce the availability of two new software products for our CLK68-1 calendar/clock board. We have enclosed these two software packages for your review. These packages (one for OS-9* and one for FLEX**) provide a comprehensive interface between the CLK68-1 board and the respective operating system.

OS-9:

The CLK68-1 software package for OS-9 provides two modules which replace two modules supplied with OS-9. These two modules (Clock and SetCLK68) provide all the required interface between the CLK68-1 board and the OS-9 operating system. Use of this software and the CLK68-1 board will speed up OS-9 when compared to systems which use CPU time to keep the clock running (such as the SWTPC S/09 or systems using the SWTPC MPT timer board or the Motorola MC6840 timer chip). Use of the CLK68-1 board also allows you to disable interrupts for long periods of time without affecting the system time since all time keeping functions are provided by the CLK68-1 board and do not require any CPU time. In addition, the time & date are maintained when the system is shut down and your startup file can cause the computer to sign on with the time/date instead of asking the operator to type it in each time.

The Clock module replaces the Microware supplied Clock module so that system interrupts may be generated (they are required by OS-9 for multitasking) and the time & date may be read (using 'DATE' or OS-9 system calls). A source listing of the Clock module is provided on the diskette.

The SetCLK68 module replaces the Settime module so that the CLK68-1 may be set. The command syntax is the same as for Settime except that SetCLK68 is an upgraded version and allows any parameter(s) to be changed without requiring all of the other parameters to be re-typed. This is very convenient when a change to daylight savings time is required and you only have to enter the new hour.

The upgraded version of Settime (and corresponding version of Clock) are available from Robertson Electronics for systems using any of the following: MM58167 clock chip, MC6840, and SWTPC MPT timer board.

FLEX:

The CLK68-1 software package for FLEX provides two FLEX compatible programs. These two programs are all that are required to interface the CLK68-1 board to the FLEX operating system. One of these files (CLK68-1.CMD) is used to read the time & date and optionally display it on the console and/or update the FLEX date registers. An ASCII printable string is left at the top of the transient command area and is available for another program to use if desired. The other file (SetCLK68.CMD) is used to set time & date information in the CLK68-1 board. As with the OS-9 version, only those parameters which you wish to change need to be entered on the command line. The syntax is the similar to the FLEX 'date' command with the time information added.

Complete step by step instructions are provided to assist the user when installing the CLK68-1 software into a FLEX system (several versions of FLEX are covered). It is certainly convenient to have your computer log on with a printout of the time/date rather than requiring you to type it in each time you power up (or reset). The source files are included for both CLK68-1 and SetCLK68.

All versions of the software are priced at a very low \$14.95. and are available on 8" or 5" diskettes (specify).

* OS-9 is a trademark of Microware Systems Corporation
** FLEX is a trademark of Technical Systems Consultants, Inc.

'68' MICRO JOURNAL

Don Williams, Sr., Editor
P. O. Box 849
Hixson, Tenn. 37343

Frank C. Barney of Barney and Associates, Inc. of Pittsburg, Kansas has been a Southwest Technical Products computer dealer since 1975. To date we

have sold four of our local High Schools, the S W T P 6809 with eight or more terminals on each, operating with Uniflex. In doing this the high school students are trained with a system very much like the Prime that our local Pittsburg State University has, so that if students go on to college they already have the primary courses out of their way and can go into advanced programming.

We are offering two software programs written by Brian Dock, a high school senior, with the help of Frank C. Barney, and a computer science teacher, Lyle Mays.

There are a number of Ledger-Payroll programs available but our program is different in that it is based on the single entry bookkeeping system promoted by the drug company, Eli Lilly, which has been used by drug stores since 1930. This is in no way to infer that this ledger is only good for drug stores because a ledger is a ledger in any business. It is also written for MOM & POP operations, where Mom buys a new dress and writes a check on the business, but it cannot be listed as a business expense, so that check is not listed and then the I. R. S. wants to know where that check is and what it was for. In our program you have a NON-DEDUCTIBLE entry so that all checks can be listed to satisfy I. R. S.. It is as the ad says for bookkeepers and not for accountants.

The Accounts-Receiveable is a linked program so that no space is wasted and it is loaded in so that nine entries can be made before anything has to go to the disk which is a time saver. It ages the accounts and keeps balances, prints one or all of the statements.

Barney and Associates, Inc. is starting its sixth year as a computer store, having sold several other brands of computers; they are now concentrating on the S W T P 6809 with emphasis in the sales of computers to small businesses and schools.

DON WILLIAMS
68 MICRO JOURNAL
P.O. BOX 849
MIXSON, TENNESSEE 37343

DEAR DON:

In my previous letter I mentioned that the baud rate is limited to 600 baud. Not so!!! The revised edition of the Color Basic manual shows how to increase the baud rate up to 2800. This virtually eliminates the PAUSE at the printer between lines (especially if they are long).
However, if you plan to use a printer the PDI must be done beforehand. 600 baud suits me just fine. It almost paralyzes my machine.

SINCERELY,

Gary M. Conville
GARY MCCONVILLE
4144 REBEL TRAIL
DUBLASVILLE, GA. 30135

HOYT STEARNS ELECTRONICS
4131 E. CANNON DR. PHOENIX, ARIZONA 85028
602-996-1717
September 17, 1981

Don Williams, Publisher
68 Micro Journal
Box 849
Mixson, Tn. 37343

Dear Mr. Williams:

I have "Cassette Color Porta" for the TRS-80 color computer. Screens can be saved and loaded from cassette; also I have added several words on top of the "PIG" words--
They are: addr SASCAT (set display address)
DAC>GPKR (audio from DAC)
CASSE>GPKR (audio from cassette)
CLS (same as in BASIC)
data addr JSAD data (pass data in D register) .
For \$25.00 I will send a cassette containing FORTH and 1 screen containing the boot text editor. Specify 16k or 32k machines.

I will update your cassette to disk FORTH for free after I find out more about the new disk system.

More color computer info:

1. In order to run programs from EPROM in a game cartridge, you must remove C85, a 220 pf cap on the chip select line located near pin 33 on the card edge connector.
2. You can not use addresses above 16k as display pages unless you "or" in BAS1 to the VDO data latch strobe. you can use existing 7402 gates to do this - beware - if you use 64k chips, don't do the above.
3. The problems with running the CPU at double speed appear to be caused by capacitive feed through in the keyboard. The PLA that scans the keyboard never runs at high speed so that is not the problem. Maybe R or C loads on the PLA inputs would help?

Yours Truly,

Hoyt A. Stearns



NEWS RELEASE

Computerware® introduces its FINANCE PROGRAMS #1 on cassette for the Radio Shack Color Computer.

Finance Programs #1 is a useful home/business software package that extends the use of the Color Computer beyond fun and games to the practical applications of finance. Divided into two categories, LOANS and INVESTMENTS, this program package makes all of the usually laborious calculations in a matter of moments, making financial decisions faster and easier for the home user and business man.

The LOANS program performs the following:

- 1) Discount of Commercial Paper
- 2) Principal on a Loan
- 3) Regular Payment on a Loan
- 4) Last Payment on a Loan
- 5) Remaining Balance on a Loan
- 6) Term of a Loan
- 7) Annual Interest Rate on a Loan
- 8) Mortgage Amortization Table
- 9) Declining Interest Loans

The INVESTMENTS program calculates:

- 1) Future Value of an Investment
- 2) Future Value of Regular Deposits (Annuity)
- 3) Regular Deposits
- 4) Regular Withdrawals from an Investment
- 5) Initial Investment
- 6) Minimum Investment for Withdrawals
- 7) Nominal Interest Rate on Investments
- 8) Effective Interest Rate on Investments
- 9) Earned Interest Table

Finance Programs #1 costs only \$21.95 and is available directly from Computerware® at Box 668, 1472 Encinitas Blvd., Encinitas, Ca. 92024, (714)-438-3512.

Box 668 • 1512 Encinitas Blvd. • Encinitas, California 92024
Phone: • Office (714) 438-3512

COMPUWORLD Inc.

COMPUWORLD was incorporated in August of 1977 in a small store with less than 600 sq. ft. by Fred and Nancy Colev. Prior to opening COMPUWORLD Inc., Fred Colev had received a B.S.E.E. degree from Rochester Institute of Technology and has worked as Regional Software Consultant for Digital Equipment Corporation and had served as Systems Manager for Strosberg Carlson Corporation.

One of the first product lines carried by COMPUWORLD Inc. was the Southwest Technical Products Corporation computer system which was available only in kit form.

Within the first year, sales more than doubled original projections and COMPUWORLD Inc. was moved to its present 3000 sq. ft. location. Sales continued to increase and COMPUWORLD Inc. added the subsidiaries of COMPUWORLD Services and COMPUWORLD Software. COMPUWORLD Software became the foremost pioneer in developing and marketing advanced business packages for the Unix Operating System developed by Technical Systems Consultants for the SVTTC computer systems which had since grown to a powerful business system.

COMPUWORLD Software has also developed and distributed software world wide for Intelligent Systems Corporation computer systems. Included among these programs are the much acclaimed ColorCalc and Color Graph programs.

COMPUWORLD Inc. has developed a strong, innovative software programming group making them one of the leaders in developing software programs for computers world wide.

COMPUWORLD Inc. will also soon be announcing the creation of a new division which will add a new dimension to the computer field and its relationship with the average person.

188 WHITE SPRUCE BLVD. - ROCHESTER, NY 14622 - (716) 484-8880

September 18, 1981
Robert Smith
P.O. Box 41-10016
Michigan City, IN 46360

Richard Don
Gimix Inc.
1337 W. 37th Place
Chicago, IL 60609

Dear Mr. Ron,

I am the inmate that you sent the 32K memory board to. I am happy to report that it is now up and running. We have been able to put a full 32K in it with the help of a lot of companies. Also we now have a 5 inch mini-floppy drive and a copy of mini Flex as our DOS.

Not to wish you bad luck, but I hope you can come to our aid once again. Would it be possible for your company to send us a 5 inch disk controller board that I could fix up? It took me 4 days to fix up the memory board. I enjoyed every minute of it. If you can please send the disk controller to the same address as before:

Mr. Joe Alinsky, Instructor
Electronics Vocational Training
P.O. Box 41
Indiana State Prison
Michigan City, IN 46360

There is only one problem with fixing up our SUTP, now I do not have it to myself. 4 other people are now working with it. Thank you again for the memory board.

Sincerely,
Robert Smith
Robert Smith #10016

EDITOR: 68 MICRO JOURNAL

14 SEPT 81

A BIG GRIPE FOR USERS OF THE EXTENDED BASIC COLOR COMPUTER HAS BEEN THE LOSS OF ONE PAGE OF MEMORY RESERVED FOR HIGH RES GRAPHICS WHEN WRITING PROGRAMS IN NON GRAPHICS OR LOW RES GRAPHICS. THERE IS NOW A WAY TO OBTAIN USE OF THIS PAGE OF MEMORY FOR USE BY BASIC. THE PROGRAM LISTED BELOW CAN BE ENTERED IN COMMAND MODE WITHOUT LINE NUMBERS.

10 FPUK 25+6

20 NEW

FPUK 25+6 WILL TELL THE COMPUTER TO START BASIC'S MEMORY AT \$0600. NEW WILL RESET THE COMPUTER TO THAT LOCATION AND MAKE 1.5% OF HIGH

RES GRAPHICS MEMORY FOR OTHER USE BY BASIC. THERE IS ONE NOTE OF WARNING THOUGH. THE USE OF HIGH RES GRAPHICS CAN CAUSE THE OVERWRITING OF BASIC PROGRAMS. YOU CAN RESET BACK TO HIGH RES BY TURNING POWER OFF THEN ON OR WITH A PCLEAR 1 TO 8. THEN LOAD THE HIGH RES PROGRAM.

KEN GOMER
10836 WHITEMALL RD
SAN DIEGO CA 92126

For Release: Immediately

START-UP COMPANY TARGETS GROWING DISK MARKET

Kansas City, August 26, 1981

Tallgrass Technologies Corporation, a new start-up company in the Kansas City area, is well positioned to supply high-demand hardware and software subsystems for the personal computer market to OEM's distributors and dealers. Incorporated since January, 1981, their broad and mature product offering includes the much needed combined controllers for both 5 1/4" Winchester disks and streaming tape drive or floppy disks. Also available is a TRS-80 Color Computer floppy disk controller which allows double-density on standard 5 1/4" floppy drives, and software that includes UCSD Pascal and FLEA.

Present host-CPU interfaces are provided for the Apple computer, Heath/Zenith 88, SVTTC SS-30, Super Brain, and Zaxox 820. There are currently plans to provide one for the new "ACORN", IBM's low-cost entry into the personal computer arena. Scheduled to be completed soon are the HP-IEEE 488 and Multibus IEEE 796, the S-100, and LSI-11*, although any host interface will be supplied as required. Disk R/W routines are available for CP/M and Apple DOS. Due to efficient, non-microprocessor designs, their products are priced substantially below others in the industry.

According to David M. Allen, Tallgrass founder and president, "the combined controller design is now being committed to semi-custom LSI to further improve the cost-effectiveness for the personal or small business computer user. The LSI design will also help achieve the smallest Winchester disk controller in the industry".

*FLEA is a trademark of Tallgrass

*TRS-80 is a trademark of Tandy Corporation

*UCSD Pascal is a registered trademark of the Regents of the University of CA.

*LSI-11 is a trademark of Digital Equipment Corporation

*CP/M is a registered trademark of Digital Research Corporation

For more information contact David M. Allen (913) 381-5588

Phone (208) 529-3210

SOFTWARE AVAILABLE FOR SOUTHWEST TECHNICAL PRODUCTS CO. COMPUTERS

NOTE: Packages identified as ISC are produced by Technical Systems Consultants of West Lafayette, Ind. Packages identified as ES were formerly produced by ED BIRTH'S SOFTWARE WORKS, now owned by Great Plains Computer Company, Inc.

APPLICATIONS PROGRAMS

ACCOUNTS RECEIVABLE (Enhanced Debraan/McGraw-Hill Version)

Another program prints customer statements. Accounts Receivable will post directly to the General Ledger accounts maintained by the GENERAL LEDGER program. The A/R program maintain customer activity totals. Other programs allow the user the enter or modify the customer data base or correct previously entered invoice information. All keyboard entries are carefully checked for validity.

ACCOUNTS PAYABLE (Roberson/AcGraw-Hill) Version 1

You can distribute the amount of each invoice to as many as 11 different General Ledger accounts. The program automatically make postings to the Cash and Accounts Payable accounts in the G/L. The 4/9 programs also maintain vendor activity totals.

GENERAL LEDGER (Enhanced Version)

An expanded 120 page manual is provided with this package.


Don Williams Sr.
68' Micro Journal
3018 Mill Road
PO Box 849
Bacon, Tennessee 37343

I have read through three issues of '68' (Feb., March, and Aug. 1981) and found too little to substantiate your claim. Am I expecting too much, too soon?? I was really hoping to find (in each issue)

Theresa M. LeDonne 1/2/19

N.B.#2 Line 100 is included for TRS-80C's equipped with
FITTED BASIC.

68 MICRO JOURNAL
5900 Cummins Blvd
HIXSON, TENNESSEE 37343-0794
(615) 842-4600



Memo
LETTER

Date 9/1/81

Subject Letter and Program

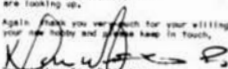
To Helene LaBouville
121 Camelot Dr., RFD 5
Bedford, NH 03102

Dear Helene, thank you for the letter and the "Life Cyclot" Tape received this week.

It is true that we have not nearly as much Color material as I or you would like, that we do have is more on the 5800 CPU than any other magazine and getting more info on the other aspects, as time passes. Also as interested readers, like yourself, display a willingness to share their efforts, without this sharing, we (or no one else) will ever have a sufficient amount of material to satisfy all our readers.

We do have a monthly column devoted to the Color computer and more articles are being processed, as they are coming up.

Again, thank you very much for your willingness to share with us your thoughts and efforts. Best of luck with your new hobby and please keep in touch,


John W. LaBouville
Cummins Blvd., Hixson

☐ Please reply ☐ No reply necessary

61000

```

100 PHODE #1,PCLEAR1
110 / LIFE CYCLE PLOTTING ROUTINE - BY MARK WILKINS
120 / MODIFIED FOR THE TRS-80C16(X-B) BY WM LABOVILLE
130 CLS
140 DIM F(12),Z$(25),T$(9)
150 DATA 31,28,31,30,31,30,31,31,31,30,31,30,31
160 DATA FIRST,SECOND,THIRD,FOURTH,FIFTH,SIXTH,SEVENTH
170 FOR I=1 TO 12: READ F(I):NEXT I
180 FOR J=1 TO 7: READ Z$(J):NEXT J
190 / INPUT DATA INTO PROGRAM
200 INPUT "CURRENT DATE (MM,00,YY)=",M3,C3,Y3
210 PRINT:INPUT "ENTER NAME"=Z$
220 PRINT:INPUT "ENTER BIRTHDATE (IN FORMAT MM,00",M1,D1
230 PRINT:INPUT "YEAR FOR WHICH THE OVRT IS DESIRED IN FORMAT YYYY",Y1
240 / CONSIDER LEAP YEARS
250 C#=(Y1/4)-(INT(Y1/4))=0 THEN C=1
260 F(2)+28=C
270 IF M3=M1 THEN 306
280 / CHART PRINTOUT
290 Y1=Y1-1
300 PRINT#2,"LIFE CYCLE CHART FOR ",Z$
310 PRINT#2,,PRINT#2,,PRINT#2,,
320 R=1
330 FOR T=1 TO 7
340 PRINT#2,T,T$(T), / PERIOD LIFE CYCLE: /
350 / ADD CONSTANT TO BIRTHDATE AND PRINT
360 R=R+1
370 X=M1
380 R#=(X)-D1
390 X=R+1
400 IF X>12 THEN Y1=Y1+1
410 IF X>12 THEN X=1
420 R#=(X)+R
430 IF R<51 THEN 358
440 R=R-51
450 D2=F(X)-R
460 R2=X
470 PRINT#2,T,T$(T),M1,"-",D1," TO ",M2,"-",D2,Y1
480 IF D2=F(X) THEN D1=1 ELSE D1=01+D2-1
490 IF D2=F(X) THEN M1=M2+1 ELSE M1=M2
500 ON T GOTO 600,1600,2600,3600,4600,5600,6600
510 PRI T#2,,PRINT#2,,
520 NEXT T
530 INPUT "ANOTHER OVRT",C$
540 IF LEFT$(C$,1)=-Y1 THEN 210
550 END

```

68 Micro Journal
3018 Samill Rd.
P.O. Box 849
Paxon, Tennessee 37343

Dear Don,

A few months ago I mentioned to my wife I would like to have a SWTPC 68K so that I could use it in learning computer programming at home. She bought a 68A with 8K of memory. I was pleased until I found that it contained neither I/O device nor an interpreter that could be used with my 6809 cassette system. I can't go into a disk system yet because of the difference of price.

I wrote SWTPC, not once but twice, asking for some help. I asked them for a cassette interface and a basic on tape or ROM. I thought they had made a mistake the first time but when I received material on only disks systems the second time you may as well know I was never more disappointed.

I know I had to try somewhere else so I called APC Products to order their cassette interface with CM/3 File Manager. Again I was disappointed when they told me they did not have software for the 6809 but I was hopeful when Jerry said he would let me know by Friday if he had decided to go ahead with this project.

Friday when I arrived home I rushed downstairs to check into the Emergency Phone Net. I was running late, so I did not see the message my wife had received from Jerry. When my wife handed the message to me she said she did not know what it meant. I was so elated when I read "yes" I had to tell all the net members.

In a short time I received my TC-3 Kit and a 6809 version of CM/3 Ver 9.01 on EPROM plus MPIL version 1.0, 6.00 and complete documentation. The kit was built in about two hours after reading the TC-3 cassette interface board instruction manual and it worked well at 2400 BAUD using my 6809 3-512K cassette recorder but would not perform at 4800. The manual states that a stereo cassette deck is the ideal choice, so I bought a tape deck and sure enough it works like a charm at 4800 BAUD. I assure you also I have had no problems loading and saving at 4800 BAUD with the same being true at 300 BAUD. Needless to say these are written in position independent code.

During this time I realized I needed more memory so I ordered a 4K 8-bit RAM/ROM Card from Texas Instrumentation and received it in about three days. I had a little trouble patching for the SWTPC 6809 but I made it. I really knew I did not have much of a problem there because Jerry told me if I needed help with any software to be compatible with CM/3, he would do the patching for me.

By now you know I must have been looking for a cassette basic which I do not know but I did order SWTPC Pascal 1.2 and received it in about three days. I had a little trouble patching for the SWTPC 6809 but I made it. I really knew I did not have much of a problem there because Jerry told me if I needed help with any software to be compatible with CM/3, he would do the patching for me.

I am so pleased with the system now, after getting off to a rough start, I want other newcomers to know if they need help it is available if they ask for it. Do not get discouraged as I did.

By the way I have enrolled in a 3 hour evening course, Introduction To Computer Use, at UTS that starts next week.

Discouraged No More

Shirley Noble

P.S. Enclosed is a check for 1 year subscription renewal.

8/29/1981

68 Micro Journal
P.O. Box 849
Paxon, TN 37343

Dear Don!

A couple of items for the Bit Bucket. When considering printers, take a careful look at the character set they use. I bought an Okidata Microline 82, partially based on the advertised "ASCII Character Set". It turns out that the printer is incapable of making a left or right bracket and the backslash. Fundamentally this renders indirect addressing in assembler and some statements in Pascal quite hard to read. A letter to their home office brought the reply that they had targeted the Microline 82 for the Trash-80 crowd, and if I really wanted the brackets I should buy a Microline 82. Nice, but no cigar, once the budget is gone for the time being. I may well get another printer, but Okidata will not be in the running when the time comes.

For those using the Percom SBC-9 processor board, and noticing that things are not quite as solid in operation as with the old HP-R2 (or whatever), it is beneficial to add a ground run from the main ground trace to the ground terminals on the +5 volt regulators, since their return now must pass through some rather narrow traces and some plated through holes, which results in unwanted ground noise on the board. I ran a short length of No. 18 PVC up the middle of the board to accomplish this and "it seems" that operation has settled down from the previous condition where there would be occasional disk seek failures, boot aborts and odd program start-ups at random intervals.

68 Micro Journal

Finally, three cheers for Ron Anderson's comment about TSC Pascal. Face it, if it does not meet Jensen and Wirth, it isn't Pascal but something else. Even esteemed Lucidata, in the 2.X series of "Pascal" compilers do not really have Pascal, but Fortran with semicolons. Extensions can be tolerated (and ignored), but exclusions and arbitrary changes are to be shunned.

Very truly yours,

Douglas K. Beck
Douglas K. Beck KEIX

4 SEP 81
531 MULBERRY
WEATHERFORD, OK 73096

MR. GARY McCONVILLE
4144 REBEL TRAILS
DOUGLASVILLE, GA 30136

DEAR MR. McCONVILLE,

I could appreciate your letter that appeared in the September issue of '68' Micro Journal. I may be able to give you some additional satisfaction with your printer & TRS-80 CC combination.

I have a Color Computer that I recently upgraded to 32K for a mere \$22. When I chose my printer I selected Okidata rather than Epson. I did so for several reasons. The Okidata Microline 82 provides both a serial and a parallel interface and also friction-feed - all standard. The 82 is also bi-directional and local-seeking just like the MX-88. The only feature that it did not offer was true descenders (where lower case B's and P's, etc extend below the line).

I had encountered the speed and lack of bi-directional printing just as you have. I have found a easy cure for my combination. On pages 289-290 of the 'Going Ahead With Extended Color Basic' manual I found printer variables. My Okidata has dip switches that let me set printer baud anywhere from 110 to 1200. The 150 decimal address for the Color Computer can also be boxed for 1200 baud. All you do is use a direct statement POKE 150,41 before you run a program that includes printing, or, include that command in a program line. When I tried this approach my Okidata burst into it's full fledged 80 CPB and full bi-directional action.

If your Epson allows you to set a 1200 baud rate, this cure could well work for you too! Good luck.

If you have not upgraded to 32K yet send me a note and I'll be glad to provide you with the instructions. All you need to know is how to solder. You will also need to buy 8-4116 chips. They can be bought from many sources now for around \$20.

SINCERELY,

Frank J. Patton

FRANK J. PATTON
(405)-772-2324 (address above)

HELP

HELP! Could you direct me to information dealing with the line of 68XX Microprocessor chips known collectively as the 6805 Family? I am interested specifically in obtaining information about Low- end development aids for the MC146805E2, Motorola's development options are tied up with high end "exorcizer" bussed equipment. There ought to be a small single board evaluation module with monitor debug and TTY or RS232C interface for the MC 146805E2. I know of none at this time. Thanks, Tom Kurkjian, 130 E Gay St., #3, W. Chester, PA 19380.

HAMS-W6SZX would like to purchase HAM software for use on RTTY and CW send/receive for the SWTPC 6800 with Flex. Contact: W6SZX-Gary, 9616 St. Andrews Dr., Santee, Cal. 92071, (714) 449-1281 call collect.

To:Don Williams,

In the very first issue of 68 MICRO JOURNAL, quite a while ago, I suggested that you should publish a list of the pinouts and rules for the SS-50 Buss. Such a list would permit one such as me to decide whether to take a chance and purchase Buss-compatible boards without danger of too many gotchas. Since Issue Number 1, I have watched each page of each issue for such a listing. To no avail. Why? My goodness, you tell me. Finally, in Volume 3 Issue 9, Keim has published the list. Now I know that I could have bought SS-50 boards back when I wanted to. Thank you, Mr. Keim. N. J. Thompson R4 Box 4160 Warren, Oregon 97053

I would like some information on connecting the SS50, S100, or Exocisor (or other Busses) to the IBM fully electronic typewriter, Model 50 or 60. Schematic of interface desired. Bert Felliss, 5457 Century Plaza, San Jose, CA 95111.

Ed's Note: Bert, SWTPC did sell an interface for the IBM model 50 electronic typewriter, however, due to numerous changes by IBM it was impossible to continue to support the interface. It was called the MP-WP interface card. It may be possible that someone may still have one that they are not using, if so they can drop you a line.

OMW - - -

Dear Sir, Two questions: 1) I might buy the TRS-80C computer, but I can't stand that keyboard! What would it take to put a good keyboard on it? 2) Do you know of any software packages for the 6800 or 69 for a dial up CBBS system? (NOT an intelligent terminal program, I have Frank Hoggs' VERY good REMOTE) Thank you, David Smith 4505 Kennedy Blvd. N. Bergen, N J 07047

CLASSIFIED ADS

SWTPC, PR-40 printer \$125. CT-64 video terminal with modem \$150, OSO 68047 VG1 Color graphics card \$75. E. Skar June. 1-313-732-1917

Centronics 730 Printer. New, only tested. Extra ribbons, full documentation, \$600. UPS COO. D. Dingley, 417 Liberty St., Painesville, OH 44077. (216) 354-5759.

SWTP 6800 28K, Modified CT-1024, GT-6144, MPS, MPL, AC30, MPA2 Bare Board, SWTBUG. Best offer. Rich Chudoba, 9228 Parkside, Oak Lawn, IL 60453.

4-MPM 4K memory boards \$30. each. 1 bare MP-MB new \$10, 1 bare MP-LA new, \$7.00, 1 MP-S new \$20, 1 OC 2 disk controller \$50, 1 partially assembled CT-64 main board w/serial and memory \$50, 1 partially assembled CT-1024 \$25, 1 AC30 cassette \$50, 1 Top case for CT-64 or CT-1024 \$10, Software all \$10 each, SWTPC cassette's 8K Basic V2.3, MP-R V1, Disassembler V4 and TSC 6800 Mnemonic Assembler CT68-26, 6800 Text Editor CT68-24. Rick Richardson, 6316 Old Melrose Rd, Roseburg, OR 97470, 1-503-672-7228 (9-2 pm EST)

One SSB M-16A 16K static memory board w/doc. Factory A&T; works fine. \$200. Two SWTPC MP-M 4K static memory boards w/doc. Addr in upper 32K; works fine. \$40 each. Bruce Henry, RT 3, Box 864, Farmington, NM 87401, 505-632-2165.

SWTPC MP-8M 8K static memory board, 2Mhz socketed \$100/ best offer. Stephen Sherman, RO 1, Burdett, NY 14818. 607-546-2620.

SOFTWARE FOR THE HARDWARE

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TINY PASCAL compiler in FORTH, 6800/09 \$75 (\$20)
Data Base Management Tool Kit \$200 and up. Write.

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- Simplified method for underline, bold-face, superscript, etc.
- Supports NEC, Diablo, Qume, 737, and 739 printers.
- Can be user configured for virtually any terminal or printer.

\$295, manual \$15, updates from old versions \$180.

STYLOGRAPH 3.0

This version is designed for "tty" printers but is otherwise identical to version two. It does not support specialty characteristics such as superscript, subscript, incremental printing, and proportional printing.

\$195, manual \$15, updates from old versions \$90.

STYLOGRAPH MAIL MERGE

This program takes files of variables, such as names and addresses, and inserts them into a Stylograph text file for automated mail list generation. It will also allow a number of Stylograph text files to be appended at printout time so that page numbers and headings will be continuous in the printout.

\$125, manual \$10.

STYLOGRAPH SPELLING CHECKER

This is a valuable addition to any word processing application. It checks all words in a manuscript against an internal dictionary. The dictionary included has a vocabulary of over 20,000 words and is fully expandable. New words encountered in the text may be added to the dictionary making the creation of custom tailored and foreign language dictionaries a snap.

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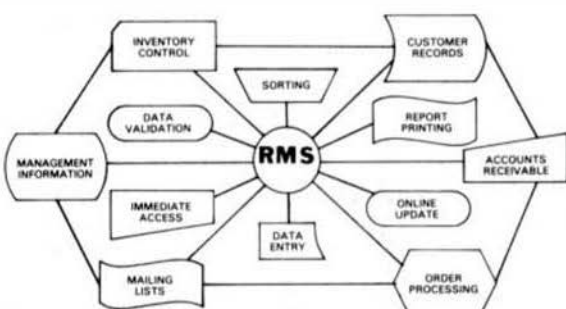
6809

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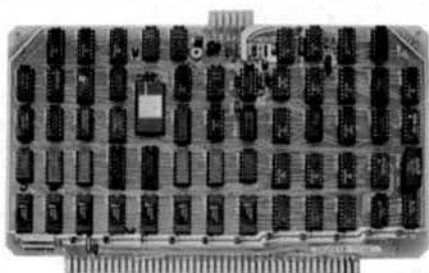
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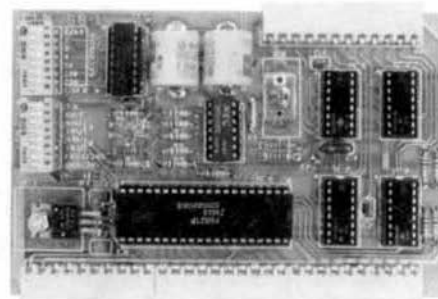
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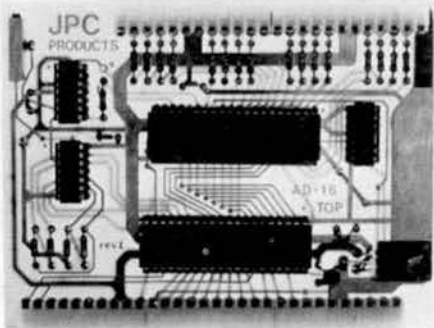
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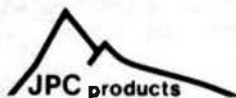
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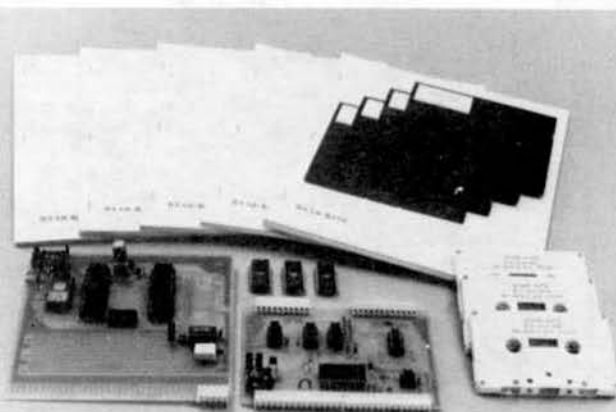
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'68' Micro Journal

STAR-KITS



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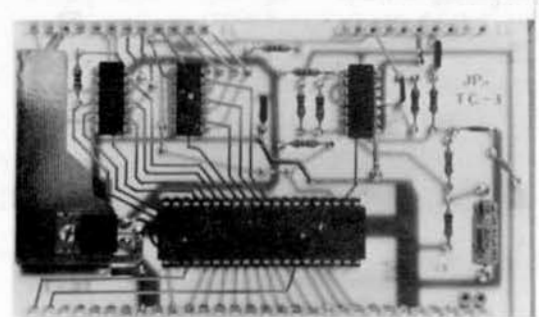
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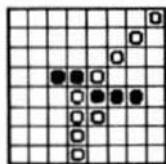
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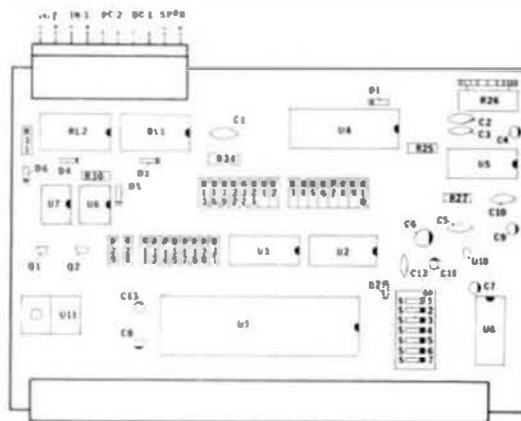
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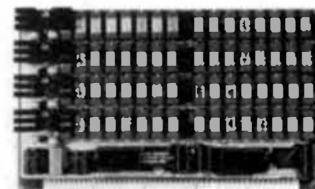
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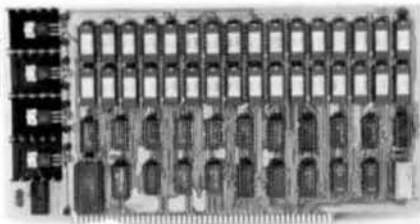
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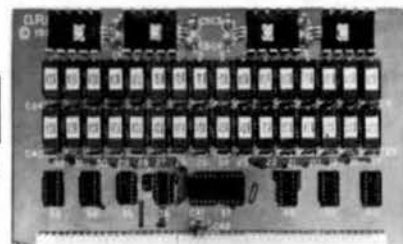
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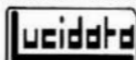
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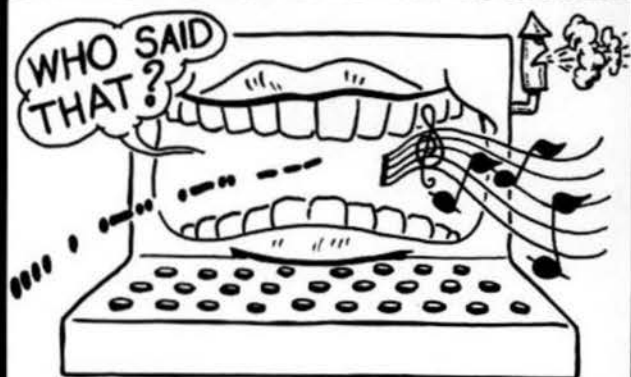


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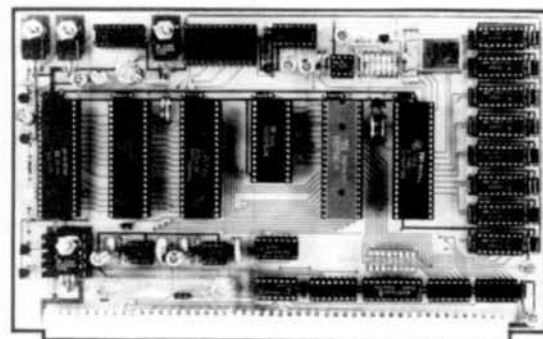
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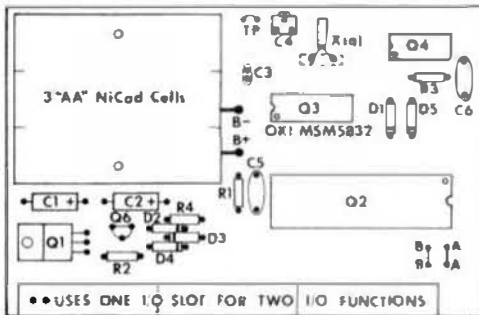


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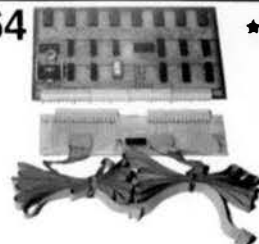
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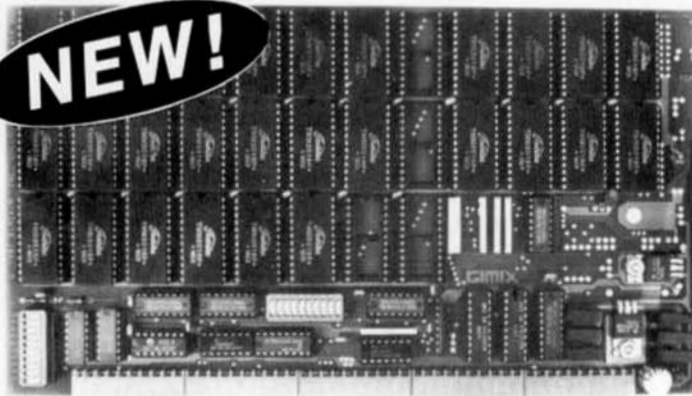
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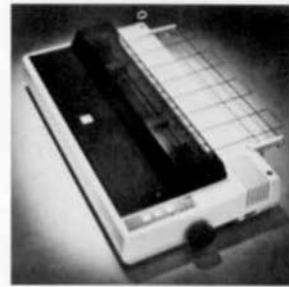
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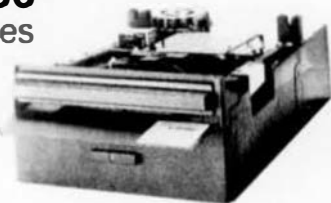
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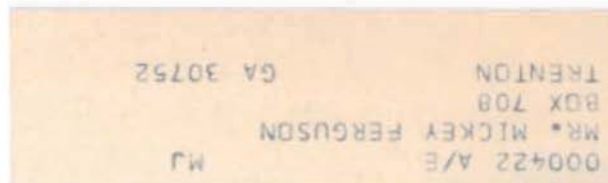
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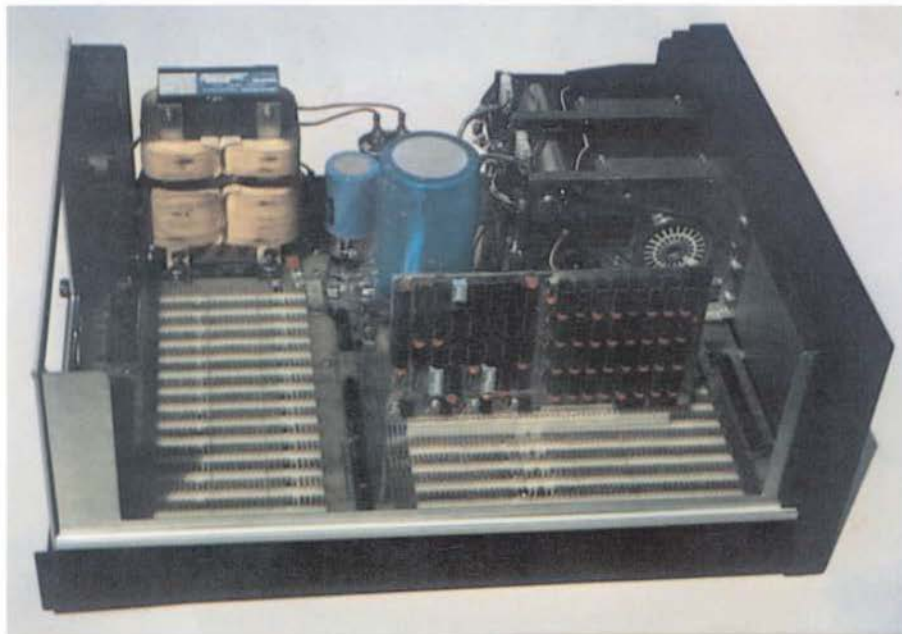
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